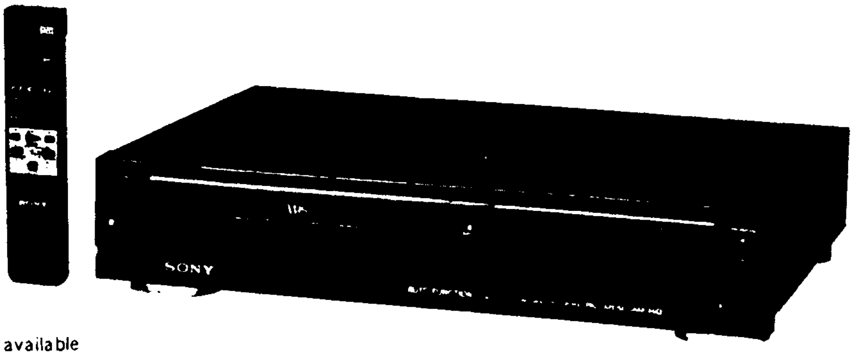
SLV-252EE
RMT-V252

SERVICE MANUAL

East European Model



Remote commander RMT-V252 is available as a unit, but as indivdual parts the battery case lid of commander is only available.

SPECIFICATIONS

System

Format	VHS standard
Video recording system	Rotary 2-head helical scanning system
Audio recording system	Monaural
Video signal	PAL/SECAM color
Tape speed	23.39 mm/sec.
Maximum recording time	240 minutes with E-240 cassette
Fast-forward and rewind time	Approx. 4 min. 15 sec. (T-120)
Audio frequency response	80 Hz - 10 KHz
Distortion	Less than 4%
Wow and flutter	Less than 0.35%

Tuner section

Tuner system	39-position voltage system tuner
Channel coverage	PAL B/G, SECAM B/G VHF channels 2 – 12, X-Z, S1 – S20 UHF channels 21 – 69 SECAM D/K VHF channels R1 – R12 UHF channels 21 – 69 PAL D/K VHF channels C1 – C12 UHF channels C13 – C56
Antenna	75 ohm antenna terminal for VHF/UHF
RF converter output	UHF channel 30 to 39

Inputs and outputs

LINE IN	VIDEO IN (phono jack) (1) input signal: 0.5 – 2.0Vp-p, 75 ohms ±5 ohms AUDIO IN (phono jack) (1) input level: –20 dBs input impedance: more than 50 kilohms
LINE OUT	VIDEO OUT (phono jack) (1) output signal: 1.0 ±0.2Vp-p, 75 ohms ±5 ohms AUDIO OUT (phono jack) (1) output level: –8 dBs output impedance: less than 10 kilohms

Timer section

Clock	Quartz locked
Timer indication	24-hour indication
Timer setting	8 programs for 1 year max.
Power back up	Back-up duration: approx. 5 minutes
Tape counter	Linear time counter

General

Power requirements	220V AC, 50Hz
Power consumption	30 W
Dimensions	Approx. 420 x 90 x 321 mm (w/h/d) (16 5/8 x 3 5/8 x 12 5/8 inches)
Weight	Approx. 5.9 kg (13 lb.)

Wireless commander RMT-V252

Remote control system	Infrared control
Power requirements	3V DC, two R6 batteries
Dimensions	Approx. 40 x 18 x 175 mm (w/h/d) (1 5/8 x 2 3/32 x 7 inches)
Weight	Approx. 59 g (2 oz) (not including batteries)

Accessories supplied

Wireless commander RMT-V252 with two R6 batteries	(1)
75-ohm coaxial cable with DIN type connector	(1)
Schematic diagram	(1)

Design and specifications are subject to change without notice.

MICROFILM

VHS VIDEO CASSETTE RECORDER

SONY

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

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WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.

To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.

On color broadcasting systems
This unit is designed to receive, record and play back programs based on the PAL (B/G and D/K), and SECAM (B/G and OIRT) color systems.

- Tapes recorded with the French SECAM color system can be played back on this unit but the picture displayed will be in black and white. It is not possible to receive French TV broadcasts with this unit.

Caution
Television programs, films, video tapes and other materials may be copy righted.
Unauthorized recording of such material may be contrary to the provisions of the copyright laws.

- AC power cord must be changed only at the qualified service shop.

SECTION 1
GENERAL

This section is extracted from instraction manual.

Precautions

On safety

- Operate the unit only on 220V AC, 50Hz.
- Should any solid object or liquid fall into the cabinet, unplug the unit and have it checked by qualified personnel before operating it any further.
- The unit is not disconnected from the AC power source (mains) as long as it is connected to the wall outlet, even if the unit itself has been turned off.
- The nameplate indicating operating voltage, power consumption, etc. is located on the rear of the unit.
- Unplug the unit from the wall outlet if it will not to be used for and extended period of time. To disconnect the cord, pull it out by the plug. Never pull the cord itself.

On Installation

- Allow adequate air circulation to prevent internal heat build-up.
- Do not place the unit on surfaces (rugs, blankets, etc.) or near materials (curtains, draperies) that may block the ventilation slots.
- Do not install the unit near heat sources such as radiators or air ducts or in a place subject to direct sunlight, excessive dust, mechanical vibration or shock.
- The unit is designed for operation in a horizontal position. Do not install it in an inclined position.
- Keep the unit and cassette tapes away from equipment with strong magnets, as for example a microwave oven or a large loudspeaker.
- Do not place any heavy object on the unit.

On operation

- When the unit is not in use, turn the power off to conserve energy and to extend its useful life.
- Remove and store video cassettes after recording or playback.
- Store the cassettes in their cases and keep them in an upright position to prevent intrusion of dust and uneven winding.

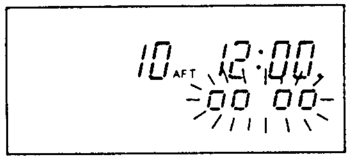
On moisture condensation

If the unit has been brought directly from a cold to a warm location, moisture may condense on the video head drum. In this condition, the tape may adhere to the head drum, and cause a serious damage to the head. To avoid possible damage caused by moisture condensation, be sure not to leave a cassette inside the compartment when the unit will not be used.

When the unit is first installed, or when it is moved from a cold to a warm location, wait for about 20 minutes before operating it so that its temperature becomes identical to the room temperature.

If moisture condensation is present ...

The 0000 indication in the display window blinks, and the unit will not operate.



Leave the unit until its temperature reaches the room temperature and the indicator stops blinking.

On cleaning

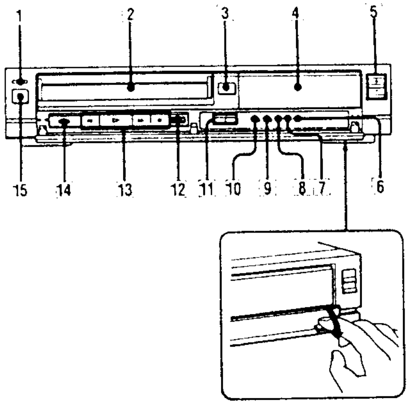
Clean the cabinet, panel and controls with a dry soft cloth, or a soft cloth slightly moistened with a mild detergent solution. Do not use any type of solvent, such as alcohol or benzine, which might damage the finish.

On repacking

Do not throw away the carton and packing materials.
They make an ideal container in which to transport the unit. When shipping the unit to another location, repack it as illustrated on the carton.

If you have any questions about this unit, contact your Sony service facility.

Location and Function of Parts and Controls



Front

1 ⏻ **ON (power on) indicator**

2 **Cassette compartment**

3 ⏏ **EJECT button**

4 **Display window**

5 **PROGRAM +/– buttons**
Press to select the program positions. Press + to advance and – to go back.

6 **ALL CLEAR button**
Press to clear the current date and clock setting. Also press this button to clear the timer for the timer-activated recording.

7 **TUNER PRESET button**

8 **CLOCK SET button**
Press to start the date and clock setting.

9 **NEXT button**
Press to advance to the next item to be set during date and clock setting, or program presetting.

10 **TIMER SET button**
Press to start the setting of timer recording.

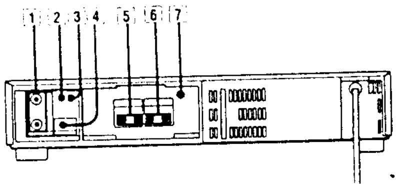
11 **TRACKING/FINE TUNING ▼ ▲ buttons**
Pressing either of the buttons may help clear possible streaks on the screen, especially when playing back tapes recorded on another VTR. Used also to fine-tune weak TV stations.

12 ● **REC (record) button**
Press to start recording.

13 **Tape transport buttons**
◀◀ REW (rewind) button
▶ PLAY button
▶▶ FF (fast-forward) button
❚❚ PAUSE button

14 ⏻/■ **(power/stop) button**
When the power is turned off, press to turn on the power. When the unit is operating, this button is used as the stop button.

15 **Remote sensor**



Rear

1 **AERIAL IN/OUT connectors**

2 **TEST SIG. ON/OFF (test signal on/off) switch**
When this switch is set to ON, the VTR emits test signal used to tune the channel for the VTR on the TV.

3 **TV SYSTEM selector**
Set to the position that conforms to the TV system of your area.

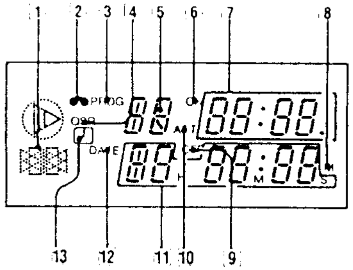
4 **RF CHANNEL selector**
Used to select the channel for the VTR, from 30 to 39.

5 **LINE IN VIDEO/AUDIO (video/audio input) jacks (phono type)**

6 **LINE OUT VIDEO/AUDIO (video/audio output) jacks (phono type)**

7 **V-LOCK (still picture vertical lock) screw**
Turn this screw if still picture moves up and down.

Location and Function of Parts and Controls



Display Window

1 **Mode display**

2 **Cassette indicator**

3 **PROG (program) indicator**
Appears when setting the timer for the timer-activated recording.

4 **QSR (quick start recording) indicator**
Appears while the VTR is performing quick start recording

5 **Program number/R (repeat) indicator**

6 **ON (on-time) indicator**

7 **Current time/tracking position indicator**
Indicates the current time. Also indicates the timer-activated recording start time.
When adjusting tracking, indicates the tracking position.

8 **M (memory) indicator**

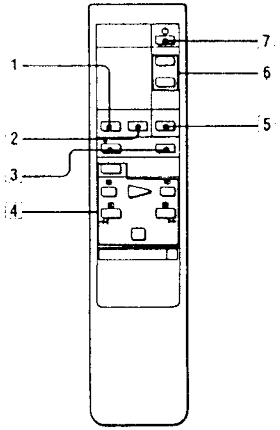
9 **OFF (off-time) indicator**

10 **AFT (automatic fine tuning) indicator**

11 **Linear tape counter**
Used also to indicate the timer-activated recording end time.

12 **DATE indicator**

13 ⌚ **(timer) indicator**
Appears while the VTR is waiting for the turn-on time of timer recording or during a timer recording.



Wireless Commander RMT-V252

1 **COUNTER MEMORY/REPEAT button**

2 **COUNTER RESET button**

3 **● REC button and recording auxiliary button**

4 **Tape transport buttons**
II PAUSE
◀◀ ▶▶ SEARCH
▶ PLAY
◀◀ REW (rewind)
▶▶ FF (fast-forward)
■ STOP

5 **AUTO PLAY button**

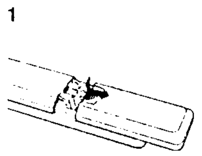
6 **PROG +/– (program +/–) buttons**

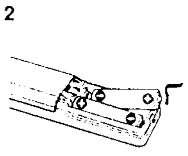
7 ⏻ **(on/stand-by) button**

Battery insertion

1 Open the lid.

2 Insert two R6 (size AA) batteries with correct polarity, and close the lid.



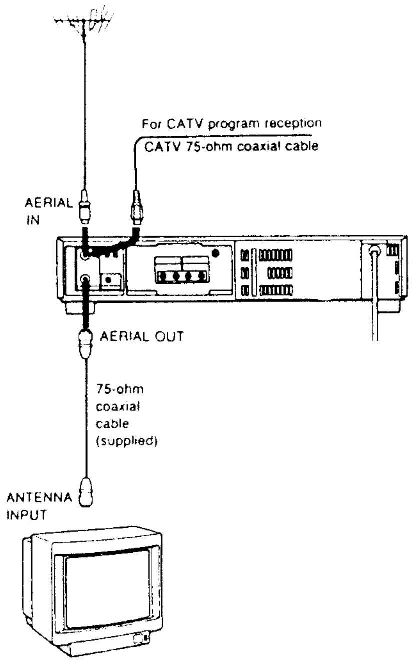


Battery life
With normal operation, batteries will last for approx. six month.

If the wireless commander will not be used for a long period of time
Remove the batteries to avoid possible damage from battery leakage.

Preparations

Connections


For CATV program reception
CATV 75-ohm coaxial cable
AERIAL IN
AERIAL OUT
75-ohm coaxial cable (supplied)
ANTENNA INPUT

Connecting a CATV cable

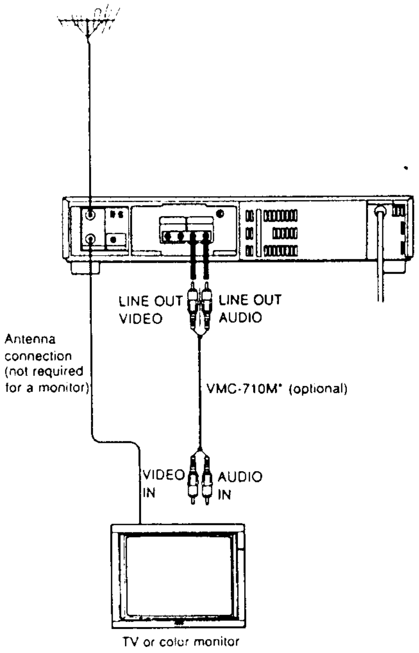
We recommend that you consult your cable company to make sure that the cable is properly connected.

When your TV is not cable TV compatible type

Connect the cable TV channel converter between the VTR and the TV so that you can watch another cable TV program while recording one cable TV program.

Before making connections

- Turn off all equipment.
- Do not connect the AC power cord to a wall outlet until all the connections of the VTR and the TV have been completed.
- Make connections firmly. Loose connections may cause a distorted picture.


LINE OUT VIDEO
LINE OUT AUDIO
Antenna connection (not required for a monitor)
VMC-710M* (optional)
VIDEO IN
AUDIO IN
TV or color monitor

With this type of connection, you do not need to determine a channel for the VTR.

Connecting a TV or Color Monitor Equipped with Video/Audio Input Jacks

For a high-quality picture, connect a color monitor or a TV equipped with video/audio input jacks.

When you connect a color monitor

You cannot watch a TV program while recording another program. If you want to do so, use a component TV tuner together with the monitor. Make the same connection as in the case of the VTR and the conventional TV receiver described on page 8.

For details on the connection of the TV tuner and the monitor, refer to the instruction manual of the TV tuner.

To watch the playback picture

Set the TV/VIDEO input selector on the TV or monitor to VIDEO.

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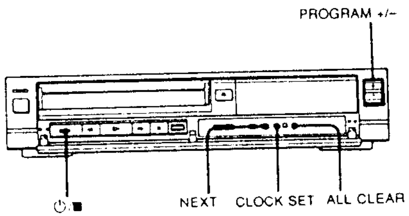
* If a TV has the AUDIO L and R jacks, use the VMC-910MS (optional).

Date and Clock Setting


PROGRAM +/–
⏻/■
NEXT
CLOCK SET
ALL CLEAR

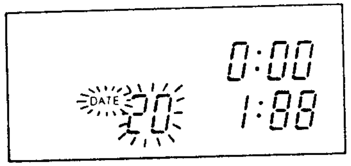
When you connect the AC power cord to a wall outlet, the current time indicator shows "88:88" and blinks.
You can set the date and clock by using the buttons on the VTR.

Setting the Date and Clock

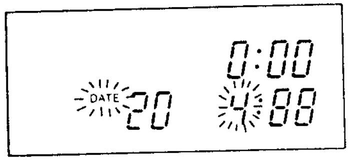
Example: to set the date/clock to 17:30, April 20, 1989

1 **Turn on the power by pressing ⏻/■.**

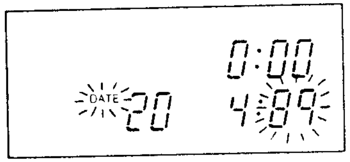
2 **Press CLOCK SET.**
Set the date with the PROGRAM + or – button until "20" appears.


DATE
20
0:00
1:88

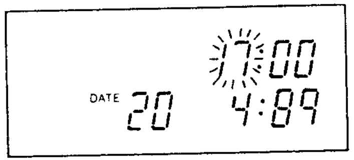
3 **Press NEXT.**
Set the month with the PROGRAM + or – button until "4" (for April) appears.


DATE
20
0:00
4:88

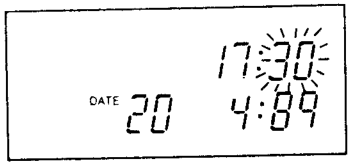
4 **Press NEXT.**
Set the year with the PROGRAM + or – button until "89" (for 1989) appears.


DATE
20
0:00
4:89

5 **Press NEXT.**
Set the hour with the PROGRAM + or – button until "17" appears.


DATE
20
17:00
4:89

6 **Press NEXT.**
Set the minute with the PROGRAM + or – button until "30" appears.

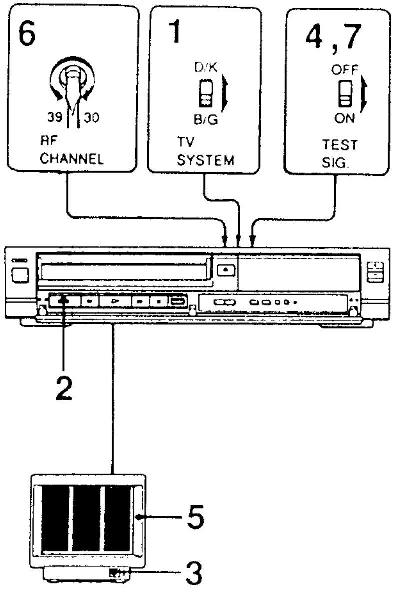

DATE
20
17:30
4:89

7 **Press NEXT.**
For accurate setting, press NEXT at the same time with an announced time signal.
The clock will now show the current time.

Clearing the current time setting

Press ALL CLEAR.
The current time display shows "88:88". You can reset the current time.

Adjusting the TV



Test pattern picture

One of the television program positions must be adjusted to receive the signal from the VTR.
If you connect a monitor or TV equipped with video/audio input jacks, this adjustment is not necessary.

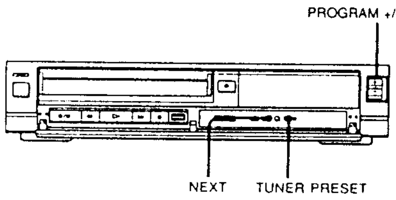
1. **Set TV SYSTEM to the position that conforms to the TV system of your area.**
   D/K: For PAL D/K or SECAM D/K
   B/G: For PAL B/G or SECAM B/G
2. **Turn on the power by pressing ⏻/■.**
3. **Turn on the TV.**
4. **Set TEST SIG. to ON.**
5. **Set the TV to a UHF channel (30 to 39) which is not used to receive a TV station.**
6. **Turn the RF CHANNEL selector with a small screwdriver so that the test pattern is clearly shown on the TV screen.**
7. **Set TEST SIG. to OFF.**

Presetting the Active Channels in Your Area

You can preset the preferred channels in the desired program positions.

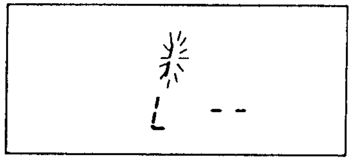
Before presetting TV channels

- Turn on the VTR and the TV.
- Make sure that the TV is set to the correct channel for the VTR.
- Check that the TV SYSTEM selector is set to the appropriate position according to the TV system in your area.

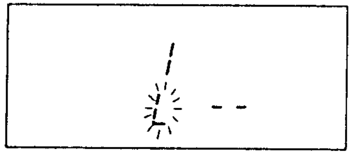


Presetting the Active Channels

1. **Press TUNER PRESET.**
2. **Press PROGRAM +/– until the desired program position number appears in the display window.**



3. **Press NEXT.**
   Press PROGRAM +/– until the desired band indicator appears in the display window.



Refer to the following table for the band indicator and the corresponding channels.

Band Indicator	**Corresponding channels**		
	PAL B/G SECAM B/G	**PAL D/K**	**SECAM D/K**
L	VHF 2 to 4 X to Z, S1 to S2	VHF C1 to C5	VHF R1 to R5
H	VHF 5 to 12 S3 to S20	VHF C6 to C12	VHF R6 to R12
U	UHF 21 to 69	UHF C13 to C56	UHF 21 to 69

"S" also will appear at the band indicator position. "S" should be selected to erase unwanted program position. (See page 14.)

For the CATV broadcastings, consult your cable company for the information on the available channels.

4 **Press NEXT.**

5 **Press PROGRAM +.**
A channel being used for a broadcast is found automatically within the band selected at step 3.

6 **If the channel found at step 5 is not the desired one, press PROGRAM + or – until the picture of the desired channel appears on the TV screen.**

7 **Press NEXT.**
The selected channel is preset to the selected program position.

8 **Repeat steps 2 to 7 to preset other channels to other program positions.**
You can preset up to 39 channels.

9 **Press TUNER PRESET again when all the desired channels have been preset.**

Selecting TV Channels

Keep pressing PROGRAM +/– until the desired station is tuned in.
For lower-numbered program positions, press "–", and for higher-numbered program positions, press "+".

Fine-tuning a weak station

Normally, the automatic fine-tuning function works when a station is tuned in. (The AFT indicator appears in the display window.)
If the picture of a particular channel is not acceptable, proceed as follows:

1 **Select the unsatisfactory station by pressing PROGRAM +/–.**

2 **Press TUNER PRESET.**

3 **Press TRACKING/FINE TUNING ▼ ▲ until the best possible picture and sound are obtained.**

Erasing Unwanted Program Positions

After presetting TV channels to the program positions, you can designate unwanted program positions so that the program positions will be skipped when you search for the channel with PROGRAM +/–.

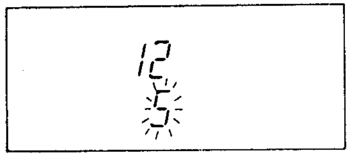
1 **Turn on the VTR and the TV.**

2 **Press TUNER PRESET.**

3 **Press PROGRAM +/– until the program position number to be skipped appears in the display window.**

4 **Press NEXT.**

5 **Press PROGRAM +/– until "S" appears and blinks at the band indicator position in the display window.**



6 **Press NEXT.**

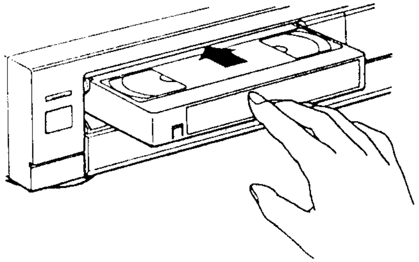
7 **Repeat steps 3 to 6 to designate another program position to be skipped.**

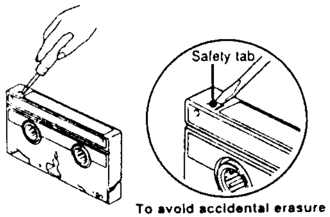
8 **Press TUNER PRESET.**

Canceling the skip function

Preset again the TV channel to the program position which has been set to be skipped.

Handling Video Cassettes





To avoid accidental erasure
Break off the safety tab.

Inserting a Cassette

Insert a cassette by gently pressing the center of the back of the cassette.
The power will be turned on automatically.

Ejecting a Cassette

Press ≜ EJECT.
When the power is off and ≜ EJECT is pressed, the VTR turns on automatically and the cassette is ejected.
After which, the power is turned off automatically.

Note
While the VTR is in recording mode, press ⏻/■ to stop recording and then press ≜ EJECT.

To Avoid Erasing a Recorded Tape

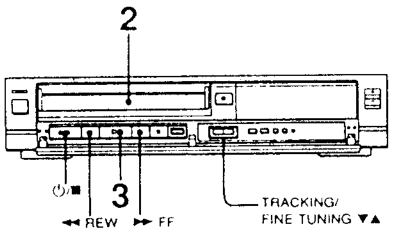
When a new recording is made on a previously recorded cassette, the old recording will be erased automatically.
To avoid accidental erasure, break off the safety tab using a screwdriver or similar tool.

To re-record a cassette whose safety tab is broken off

Cover the slot where the safety tab used to be located with cellophane tape.

Operation

Playback



Direct Power-on and -off System

Direct power-on
When a button on the VTR is pressed (PROGRAM +/–, TUNER PRESET, CLOCK SET, TIMER SET, ◀◀ REW, ▶ PLAY, ▶▶ FF) while the VTR is connected to the AC power source and a cassette tape is inserted, the power is turned on automatically. However, the power will not be turned on when ● REC is pressed, in order to prevent the VTR from entering the recording mode easily. If no cassette is inserted, direct power-on function is activated only by pressing PROGRM +/–, TUNER PRESET, CLOCK SET and TIMER SET.
For the wireless commander, the power is turned on only when AUTO PLAY is pressed.

Direct power-off
The power will be turned off when ⏻/■ is pressed in the stop mode.

The SLV-252EE plays back a tape recorded in the SP (standard play) mode only.

Playing Back a Tape

Operation using the wireless commander is also possible.

1 **Turn on the TV and select the channel for the VTR or select the input for the VTR.**

2 **Insert a cassette.**
The power is turned on automatically, and the ▰ (cassette) indicator appears.
If you insert a cassette whose safety tab is broken off, playback will start automatically.

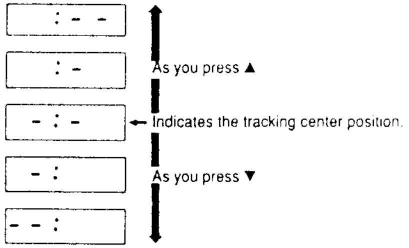
3 **Press ▶ PLAY.**
Playback begins.

Stopping playback

Press ⏻/■ on the VTR (or ■ STOP on the wireless commander).

If streaks or noise bands appear

Adjust TRACKING/FINE TUNING ▼ ▲ on the VTR.
While adjusting the tracking, the tracking position indicator appears in the display window. The tracking position will be indicated as follows:



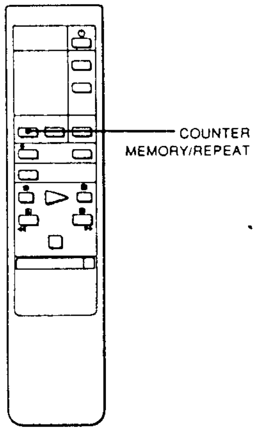
About three seconds after the button is released, the previous display (the tape counter) will reappear automatically.

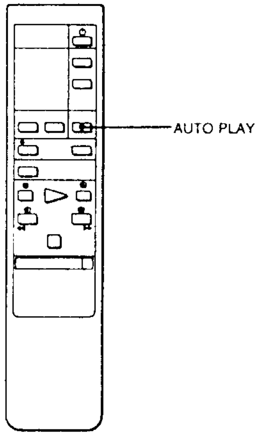
When the tape is played back to the end
The tape is automatically rewound to the beginning (auto rewind). The power remains on.
If the cassette with its safety tab removed is used, the cassette will be automatically ejected after it has been automatically rewound to the beginning.

Running the tape at a fast speed
Press ▶▶ FF.
If the tape reaches its end, it will be automatically rewound to the beginning.

Rewinding the tape
Press ◀◀ REW.

Note
Sufficient picture quality may not be obtained when a tape recorded on another VTR or a tape with unsatisfactory recording is played back.





Repeat Play

Using the wireless commander, you can repeat playback of any desired portion on a tape.

1 **Start playback of the tape.**

2 **Press COUNTER MEMORY/REPEAT at the beginning of the portion you want to play back repeatedly.**
The R indicator blinks in the display window.

3 **Press COUNTER MEMORY/REPEAT at the end of the portion to be played back repeatedly.**
You can use the picture search function (page 18) to locate the end of the repeat portion quickly.
The tape is rewound automatically to the repeat start position, the R indicator lights up, and the portion you have set by COUNTER MEMORY/REPEAT will be played back repeatedly five times.

Stopping repeat playback

Press ⏻/■ on the VTR or ■ STOP on the wireless commander. To stop repeat play and resume normal playback, press ▶ PLAY.

Auto Play

On the wireless commander: **Press AUTO PLAY.**
On the VTR: **Press ▶ PLAY while pressing ◀◀ REW.**

Using the "0H00M00S" position

If the "0H00M00S" position has been memorized, the tape will be rewound to that position, and playback starts automatically. If the "0H00M00S" position has not been memorized, the tape will be rewound to the beginning, and playback starts automatically. While the tape is being rewound, the ◁◁ indicator lights and the ▷ indicator blinks in the display window.
When playback starts, the ◁◁ indicator goes off and the ▷ indicator lights up steadily.

For how to memorize the "0H00M00S" position, see page 21.

During repeat playback
The remaining number of times the tape will be played back is displayed in the window.

To repeat playback of another portion
First stop the repeat playback, and then start playback again.
Press COUNTER MEMORY/REPEAT at any time during playback

To reset the number of times playback is repeated
During repeat playback, press COUNTER MEMORY/REPEAT on the wireless commander.
The number of times is reset to five.

Various Playback Modes

Playback pause

Press II PAUSE on the VTR or the wireless commander during normal playback.
To release pause and resume normal playback, press II PAUSE or ▶ PLAY on the wireless commander, or ▶ PLAY on the VTR.

Note
The pause mode will be released automatically about 5 minutes after the button was pressed, in order to avoid tape damage.

Picture search – using the buttons on the wireless commander

During normal playback, press and hold ▶▶ FF or ◀◀ REW on the wireless commander.
As long as the button is kept pressed, the picture can be watched at high-speed.
When you release the button normal playback will resume.

During fast-forwarding the tape, press and hold ▶▶ FF.

During rewinding the tape, press and hold ◀◀ REW.
As long as the button is kept pressed, the picture can be watched at high-speed.
When you release the button, the tape will be fast-forwarded or rewound without picture.

Locked picture search – using the buttons on the VTR or on the wireless commander

During playback, press ▶▶ FF or ◀◀ REW on the VTR, or ◀◀ ▶▶ SEARCH on the wireless commander.

During fast-forwarding or rewinding the tape, press ▶▶ FF or ◀◀ REW on the VTR.
You can watch the picture while fast-forwarding or rewinding the tape. To release the picture search mode, press ⏻/■ on the VTR or ■ STOP on the wireless commander. To release the picture search mode and resume normal playback, press ▶ PLAY.

Frame advance

During playback, press II PAUSE to enter the pause mode.

In the pause mode, each time II PAUSE on the VTR is pressed, the picture advances by 1/5 frame. When II PAUSE is pressed five times, therefore, the picture advances by one frame.
If you keep pressing II PAUSE on the VTR, the picture advances one frame every one second.
To release the frame advance mode, press ▶ PLAY.

Note
If you press II PAUSE on the wireless commander during the pause mode, normal playback will resume.

During pause, picture search and frame advance modes
Noise bands appear during pause, picture search and frame advance modes. This is normal and is not a problem.

During repeat play
During repeat play (page 17), the playback pause and frame advance functions are available. (While the tape is being rewound during repeat play, these functions cannot be activated.)

Recording TV Programs

The SLV-252EE records in the SP (standard play) mode only.

Make sure that you have finished all the connections and adjustments on pages 8 to 14.

Recording

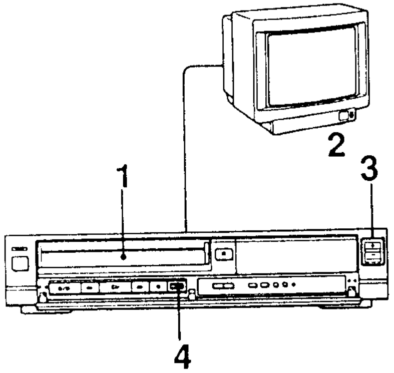
Operation using the wireless commander is also possible.

1 **Insert a cassette.**
The power is turned on automatically, and the ●● (cassette) indicator appears.

2 **Turn on the TV and select the channel for the VTR or select the input for the VTR.**

3 **Select the program position for the station to be recorded with PROGRAM +/– on the VTR or the wireless commander.**

4 **Press ● REC on the VTR, or press ● REC on the wireless commander while pressing the recording auxiliary button.**
Recording will begin.



To stop recording

Press ⏻/■ on the VTR or ■ STOP on the wireless commander.

Useful Information

When you want to record a program without watching the TV
Turn off the power of the TV or color monitor.
Recording takes place as normal.

Temporarily Stopping Recording at a Particular Point

You can stop recording when unwanted pictures appear and make the VTR enter the recording pause mode.

1 **Press II PAUSE on the VTR or on the wireless commander.**
Recording will stop and the VTR will enter the pause mode.

2 **Press ● REC on the VTR or II PAUSE on the wireless commander.**
Recording resumes.

Watching One TV Program While Recording Another

1 **Start recording of the desired TV program.**

2 **Select the channel you want to watch on the TV.**

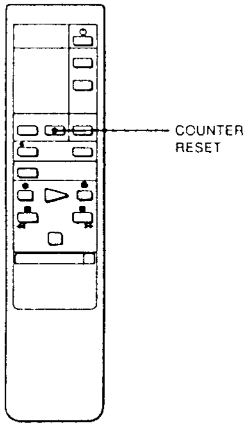
Note
If you use a color monitor, you cannot watch another channel during recording unless the monitor has an internal TV tuner.

When a cassette whose safety tab is broken off is used
The cassette will be ejected automatically when ● REC is pressed.

When the tape reaches its end
The tape is automatically rewound to the beginning (auto rewind).
The power remains on.

When you start recording
If the current time is set, the OFF indicator blinks in the display window. But the indicator goes off after about 10 seconds.
The blinking OFF indicator shows that you can set the recording end time using the quick start recording function (page 24).

Use of the Tape Counter

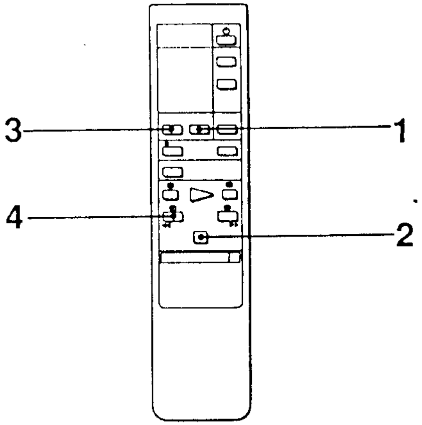


Indexing the Tape Contents

Before starting recording or playback, press COUNTER RESET on the wireless commander to set the counter to "0H00M00S." By noting the counter reading at the desired point, you can easily find that point later by referring to the counter. Use the label on the cassette to list the programs and their counter readings.

Note on the counter reading

When you insert a cassette, the tape counter will be reset to "0H00M00S."
Even after the cassette is ejected, the counter reading will be retained. When a cassette is inserted again, the counter will return to "0H00M00S."



Locating the "0H00M00S" Position

The VTR can memorize the tape position where the counter shows "0H00M00S." Once the position memorized, the VTR stops automatically at that position after fast-forwarding or rewinding. Thus you can locate a particular point quickly.

Note
In the following operation, you can use ⏻/■ on the VTR instead of ■ STOP on the wireless commander, and ◀◀ REW on the VTR instead of ◀◀ REW on the wireless commander.

1 **During recording or playback, press COUNTER RESET at the point you want to locate later.**
The counter will indicate "0H00M00S."

2 **When recording or playback is finished, press ■ STOP.**

3 **Press COUNTER MEMORY/REPEAT so that the M (memory) indicator appears.**

4 **Press ◀◀ REW to rewind the tape.**
The tape stops automatically at the position right before the "0H00M00S" point.

You can rewind the tape further by pressing ◀◀ REW again.
The tape counter shows a negative value with a minus (–) sign.
In this case, the "0H00M00S" position can be located by pressing ▶▶ FF.

Ejecting cassette automatically after rewinding the tape

Press ⏏ EJECT while pressing ◀◀ REW on the VTR. The tape will be rewound to the "0H00M00S" position, and the cassette will be ejected automatically.

To cancel the "0H00M00S" position

Press COUNTER MEMORY/REPEAT on the wireless commander while the VTR is in the stop mode.

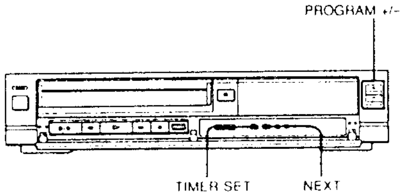
The tape counter will not work when the inserted tape has no recordings.
The counter will not advance during any portion of a tape on which no control signal has been recorded.

Timer-Activated Recording

You can preset up to **eight** recordings as much as one year in advance.

Check before setting the timer

- The date and clock must be set correctly. (See pages 10 to 11.)
- Make sure that the cassette tape is long enough to record all the programs.
- Be sure that the safety tab of the cassette has not been broken off.



Timer Setting

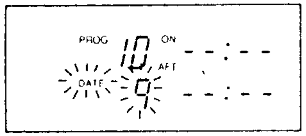
Suppose you want to make a recording of the station on the program position 10 from 11:00 to 12:30 on December 9, 1989.

1 **Insert a cassette. The VTR is turned on automatically. Turn on the TV.**

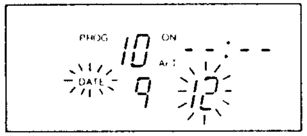
2 **Press TIMER SET.**

3 **Select the program position with PROGRAM +/–.**
Press PROGRAM + or – until the program position number 10 is displayed in the display window.

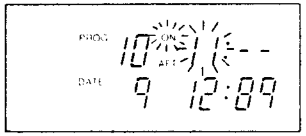
4 **Press NEXT.**
Set the day with PROGRAM +/–.
Press PROGRAM + or – until "9" is displayed in the display window.



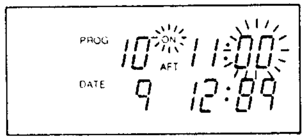
5 **Press NEXT.**
Set the month with PROGRAM +/–.
Press PROGRAM + or – until "12" (for December) is displayed in the window.



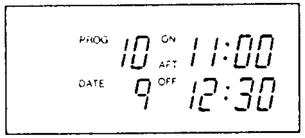
6 **Press NEXT.**
Set the hour of the start time with PROGRAM +/–.
Press PROGRAM + or – until "11" is displayed in the window.



7 **Press NEXT.**
Set the minute with PROGRAM +/–.
Press PROGRAM + or – until "00" is displayed in the window.



8 **Press NEXT.**
Set the end time with PROGRAM +/–, referring to steps 6 and 7.



9 **Press NEXT.**
The indicator appears in the window, and the VTR enters the timer stand-by mode.

To preset other program positions, repeat steps 2 to 9.
Up to eight programs can be preset.

The unit will automatically turn on when the preset time comes and will start recording. When it completes recording, the power will automatically be turned off.

Everyday recording

You can set a timer-activated recording for the same time everyday.

During presetting the timer, set both the recording date and month to "0".
And then preset the recording start time and end time.
The recording will start and end at the same preset time everyday.

Checking the Preset Time

1 **Press TIMER SET on the VTR.**
The VTR enters the timer setting mode.

2 **Press TIMER SET.**
Each time TIMER SET is pressed, the preset timer settings will be displayed successively.
When TIMER SET is pressed at the last preset program, the checking mode will be released.

Cancelling the Timer Settings

1 **Press TIMER SET until the preset timer setting to be canceled appears.**

2 **Press NEXT.**
The PROG indicator and the program position number blink.

3 **Set the program position number to "00" with PROGRAM +/–.**

4 **Press NEXT.**
The program will be canceled.

Changing the Timer Settings

1 **Press TIMER SET until the preset timer setting to be changed appears.**

2 **Press NEXT until what you want to change (hour, minute, etc.) blinks.**

3 **Change the value with PROGRAM +/–.**

4 **Continue changing the settings with NEXT and PROGRAM +/– in the same way as you have set the timer.**

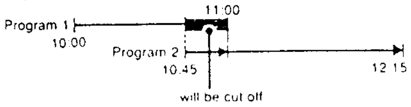
Notes
- If a power interruption of 5 minutes or more occurs while the VTR is waiting for the preset time, the memory will be cleared. Reset the clock and preset the data for timer-activated recordings again.
- If a power interruption of less than 5 minutes occurs during a timer recording, the VTR will start recording again when power is fed, and the tape counter will indicate "0H00M00S."
If a power interruption of more than 5 minutes occurs during a timer recording, recording will stop.

Note
When the month is set in the above step 5, the year will be displayed automatically.

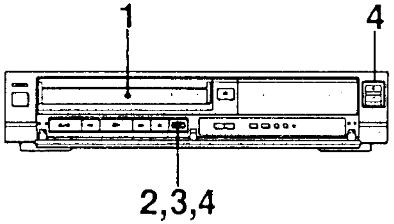
If no cassette has been inserted
When presetting operation finishes, the (timer stand-by) indicator blinks.

When the tape is reached its end
Recording stops, but the tape will not be rewound to the beginning.

When the presettings of your timer-activated recordings overlap
The recording of program 2 will begin before the recording of program 1 is completed.



Quick Start Recording



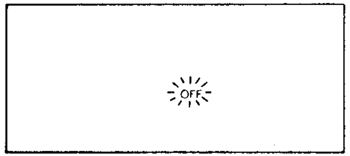
The quick start recording function provides a simplified timer-activated recording procedure.
Using this function, you can start recording a TV program immediately and leave the VTR right away.
The recording end time can be set for up to 24 hours by 30-minute or 1-minute intervals.

To Start Recording

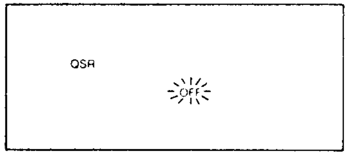
Note
In the following operation, you can also use ● REC on the wireless commander instead of ● REC on the VTR. In this case, press ● REC on the wireless commander while pressing the recording auxiliary button.

1 **Insert a cassette.**

2 **Start recording.**
The OFF indicator blinks in the display window.



3 **Press ● REC within 10 seconds.**
The QSR indicator appears.



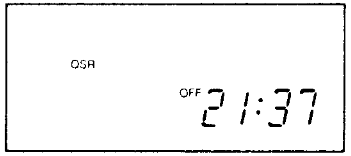
If you do not press ● REC again within 10 seconds, the OFF indicator goes off, and the recording continues to the end of the tape unless you stop recording.

4 **Using the ● REC and PROGRAM +/– buttons, set the recording end time.**
Each time ● REC is pressed, the recording end time shown will increase by 30 minutes. The PROGRAM + button increases it by 1 minute, and the PROGRAM – button decreases it by 1 minute.

Example : to set the recording end time at 21:37 while you start the quick start recording at 19:45
Press ● REC four times (the display shows "21: 30"), then press PROGRAM + seven times (the display shows "21: 37").

19:45
↓
20:00 ➡ 20:30 ➡ 21:00 ➡ 21:30
↳ 21:31 → 21:32 → 21:33 ···· → 21:37

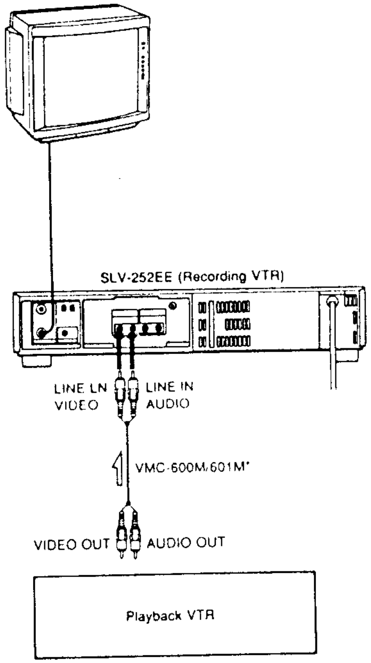
➡: ● REC is pressed.
→: PROGRAM + is pressed.



You can leave the VTR, and the recording stops when the preset recording duration has elapsed.

When the tape reaches its end
Recording stops, but the tape will not be rewound to the beginning.

Tape Editing


SLV-252EE (Recording VTR)
LINE IN VIDEO
LINE IN AUDIO
VMC-600M/601M*
VIDEO OUT
AUDIO OUT
Playback VTR

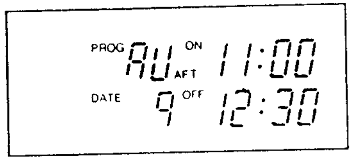
To edit a home movie tape, you need two video cassette recorders.

Editing a Home Movie Tape from Another VTR to This VTR

- Use an optional VMC-600M/601M connecting cord*.

Operation

1. **Insert a recorded cassette into the other VTR .**
2. **Insert a blank cassette into this VTR.**
3. **Press PROGRAM + or – of this VTR until "AU" is displayed in the window.**

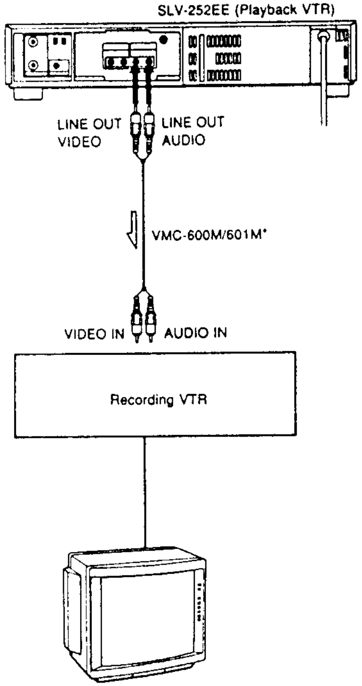

PROG
AU
ON
AFT
11:00
DATE
9
OFF
12:30

4. **Start playback with the other VTR.**
5. **Start recording with this VTR.**

Note
After editing a tape, be sure to disconnect the connecting cord from the LINE IN VIDEO and LINE IN AUDIO connectors of this VTR. Otherwise you cannot watch TV programs.

---

* If the other VTR has AUDIO L and R jacks, use a VMC-602MS/603MS (optional).


SLV-252EE (Playback VTR)
LINE OUT VIDEO
LINE OUT AUDIO
VMC-600M/601M*
VIDEO IN
AUDIO IN
Recording VTR

Editing a Home Movie Tape from This VTR to Another VTR

- Use an optional VMC-600M/601M connecting cord*.

Operation

1. **Insert a recorded cassette into this VTR.**
2. **Insert a blank cassette into the other VTR.**
3. **Start playback with this VTR.**
4. **Start recording with the other VTR.**

Note
After editing a tape, disconnect the connecting cord from the LINE OUT VIDEO and LINE OUT AUDIO connectors of this VTR.

---

* If the other VTR has AUDIO L and R jacks, use a VMC-602MS/603MS (optional).

SECTION 2
DISASSEMBLY

2-1. REMOVAL OF UPPER CASE

It is widen on both sides the back of upper case and remove up direction.

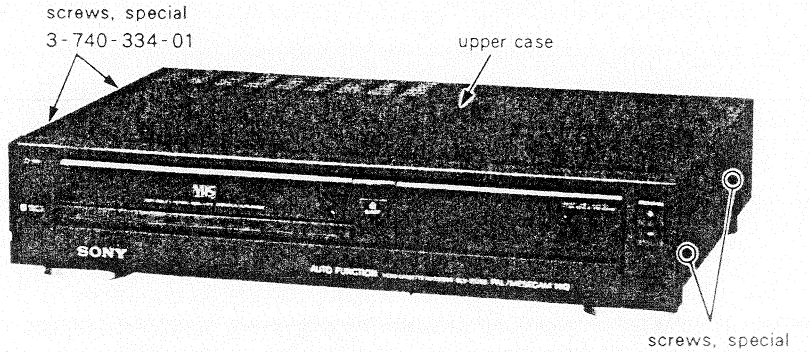

screws, special
3-740-334-01
upper case
screws, special
3-740-334-01

Fig. 2-1

Then remove the upper case.

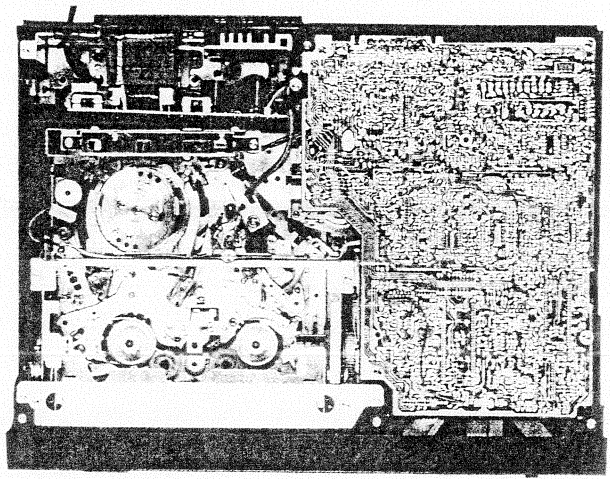


Fig. 2-2

2-2. REMOVAL OF BOTTOM PLATE

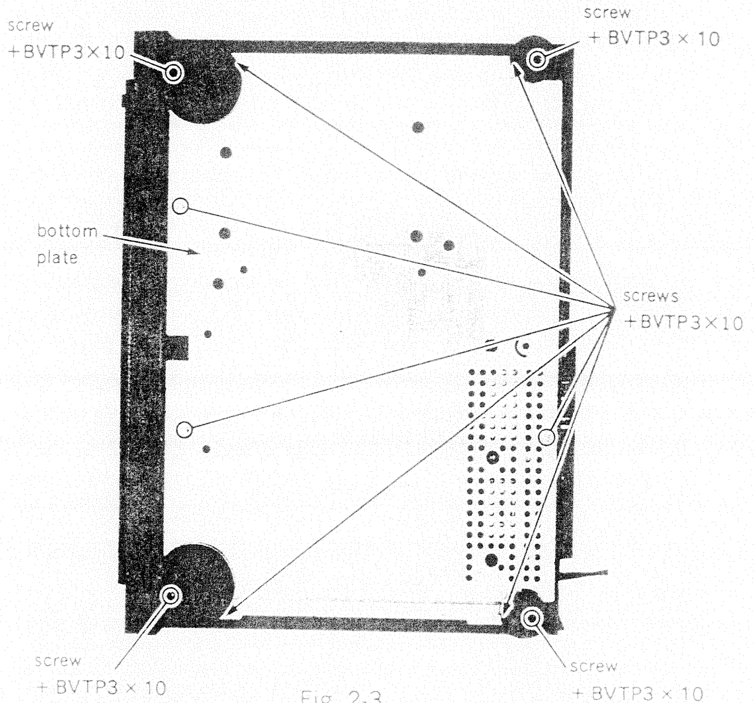

screw
+BVTP3×10
screw
+ BVTP3 × 10
bottom
plate
screws
+BVTP3×10
screw
+ BVTP3 × 10
screw
+ BVTP3 × 10

Fig. 2-3

Then remove the bottem plate

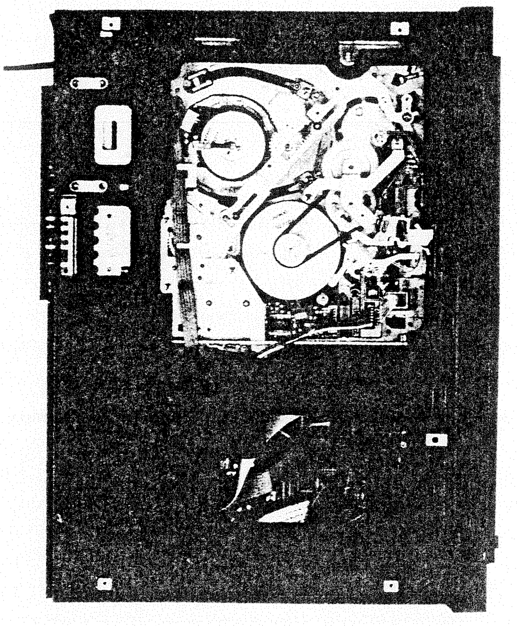


Fig. 2-4

2-3. REMOVAL OF FRONT CABINET

Then remove the upper case, and screws (+BVTP3 × 10), bottom plate and raise up the claws (two places) front cabinet as shown by Fig. 2-5, and remove front cabinet in the arrow direction.

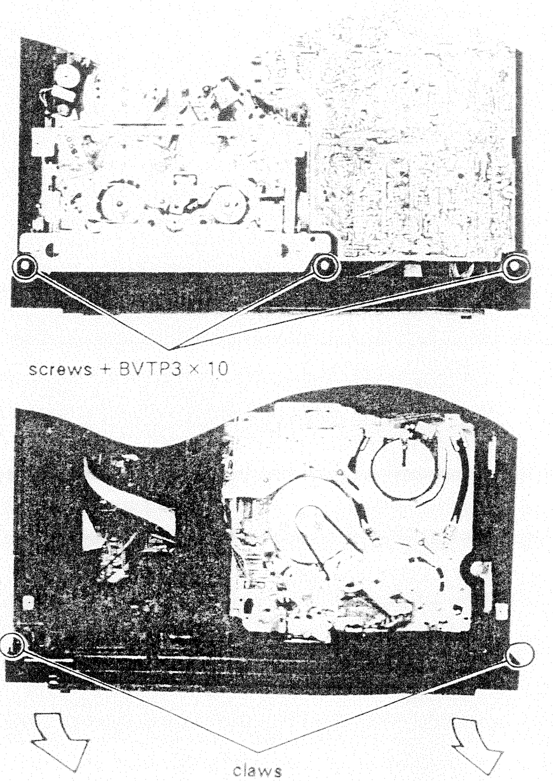
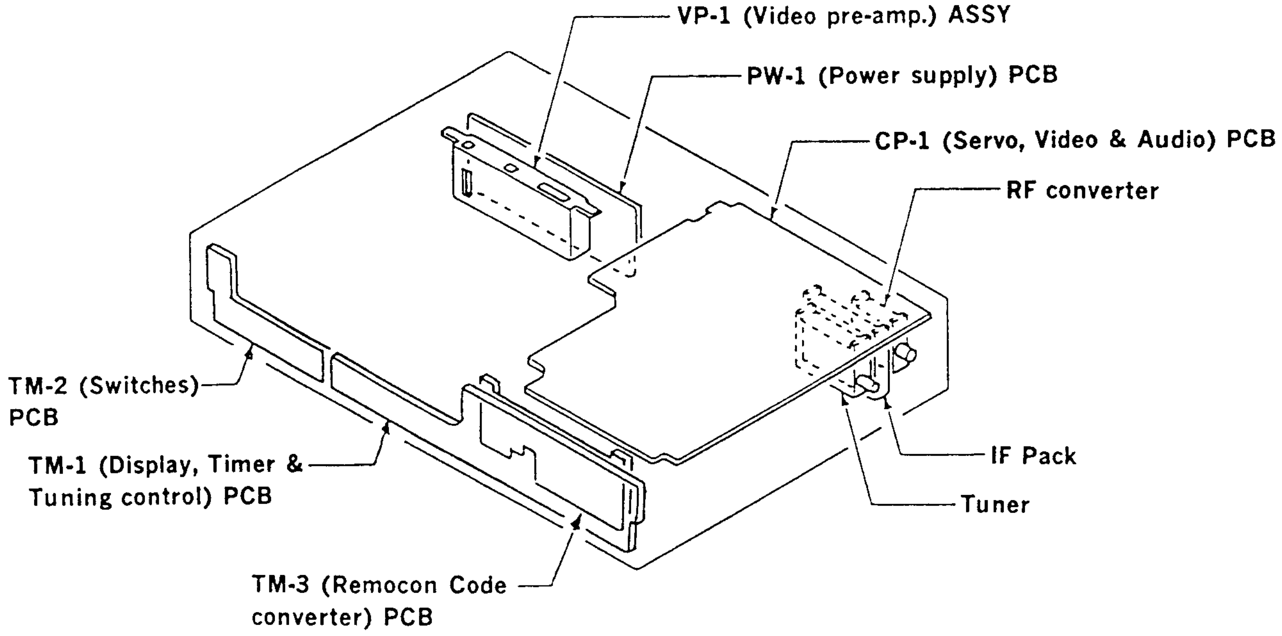

screws + BVTP3 × 10
claws

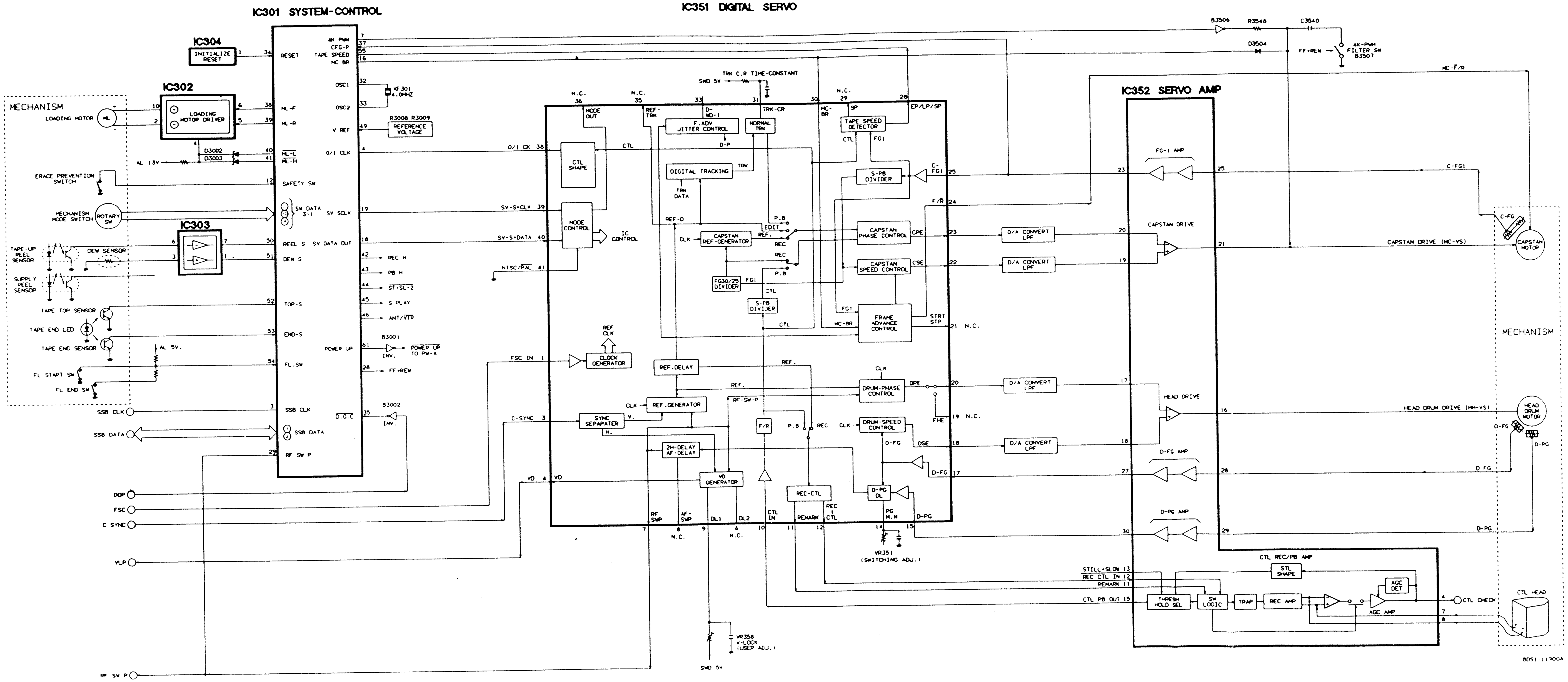
Fig. 2 – 5

SECTION 3
DIAGRAMS

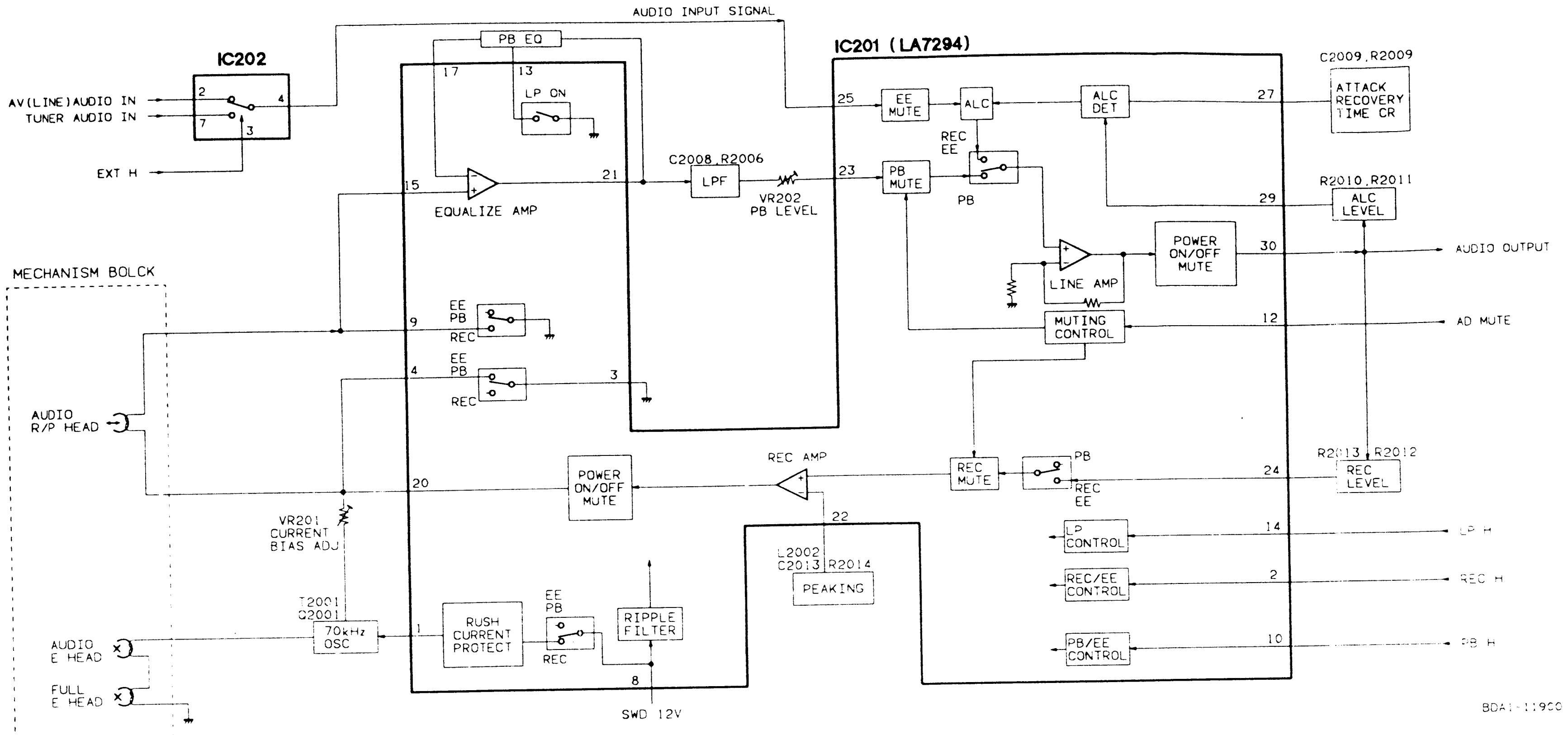
CIRCUIT BOARD LOCATIONS

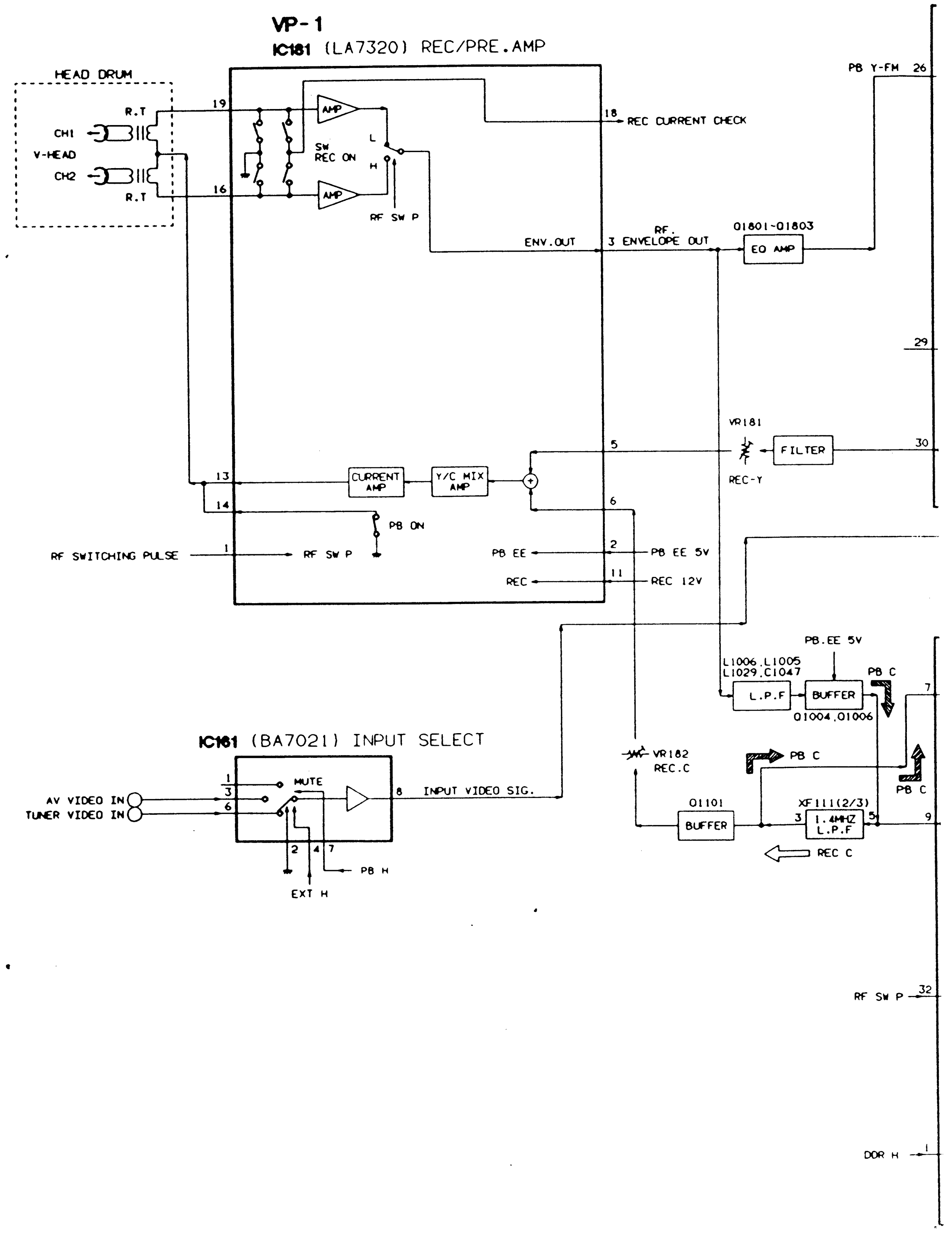

VP-1 (Video pre-amp.) ASSY
PW-1 (Power supply) PCB
CP-1 (Servo, Video & Audio) PCB
RF converter
TM-2 (Switches) PCB
TM-1 (Display, Timer & Tuning control) PCB
IF Pack
Tuner
TM-3 (Remocon Code converter) PCB

SYSTEM CONTROL & SERVO CIRCUIT BASIC BLOCK DIAGRAM

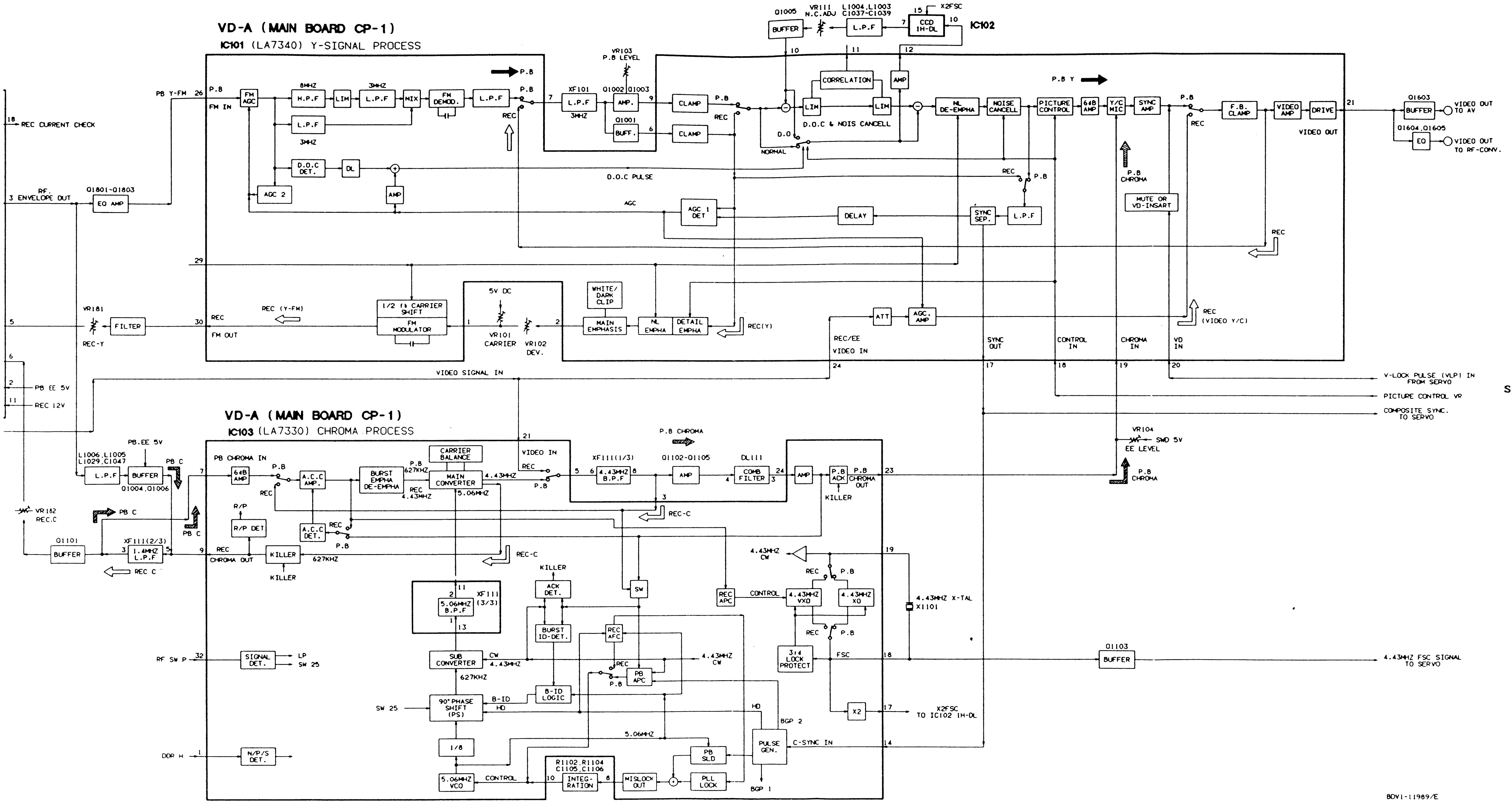

IC301 SYSTEM-CONTROL
IC304
INITIALIZE RESET
IC302
LOADING MOTOR DRIVER
IC303
MECHANISM
LOADING MOTOR
ML
D3002
D3003
AL 13V
ERACE PREVENTION SWITCH
MECHANISM MODE SWITCH
ROTARY SW
TAPE-UP REEL SENSOR
DEW SENSOR
SUPPLY REEL SENSOR
TAPE TOP SENSOR
TAPE END LED
TAPE END SENSOR
AL 5V.
FL START SW
FL END SW
RESET
ML-F
ML-R
ML-L
ML-H
SAFETY SW
SW DATA 3-1
REEL S
DEW S
TOP-S
END-S
FL.SW
SSB CLK
SSB DATA
RF SW P
4K PWM
CFG-P
TAPE SPEED
MC BR
OSC1
OSC2
XF301 4.0MHZ
V REF
R3008,R3009
REFERENCE VOLTAGE
0/1 CLK
SV SCLK
SV DATA OUT
REC H
PB H
ST·SL·2
S PLAY
ANT/VTR
POWER UP
B3001
INV.
POWER UP TO PW-A
FF·REW
D.O.C
B3002
INV.
SSB CLK
SSB DATA
DOP
FSC
C SYNC
VLP
RF SW P
IC351 DIGITAL SERVO
0/1 CK 38
SV-S·CLK 39
SV-S·DATA 40
NTSC/PAL 41
FSC IN 1
C-SYNC 3
VD 4
N.C. 36
N.C. 35
N.C. 29
MODE OUT
REF-TRK
D-MD-1
TRK-CR
MC-BR
SP
EP/LP/SP
TRK C.R TIME-CONSTANT
SWD 5V
F.ADV JITTER CONTROL
NORMAL TRK
TAPE SPEED DETECTOR
CTL SHAPE
CTL
D-P
DIGITAL TRACKING
TRK
TRK DATA
MODE CONTROL
IC CONTROL
REF-D
P.B
EDIT
REF.
REC
CLK
CAPSTAN REF-GENERATOR
FG30/25 DIVIDER
FG1
S-PB DIVIDER
C-FG1
F/R
CAPSTAN PHASE CONTROL
CPE
CAPSTAN SPEED CONTROL
CSE
FRAME ADVANCE CONTROL
STRT STP
21 N.C.
REF CLK
CLOCK GENERATOR
REF.DELAY
REF.GENERATOR
SYNC SEPAPATER
V.
H.
RF-SW-P
2H-DELAY AF-DELAY
VD GENERATOR
DRUM-PHASE CONTROL
DPE
FHE
19 N.C.
DRUM-SPEED CONTROL
D-FG
DSE
D-PG DL
REC-CTL
RF SWP
AF-SWP
DL1
DL2
CTL IN
REMARK
REC CTL
PG M.M
D-PG
N.C.
VR351 (SWITCHING ADJ.)
VR358 V-LOCK (USER ADJ.)
SWD 5V
D/A CONVERT LPF
B3506
R3548
C3540
D3504
FF·REW
4K-PWM FILTER SW B3507
MC-F/R
IC352 SERVO AMP
FG-1 AMP
CAPSTAN DRIVE
HEAD DRIVE
D-FG AMP
D-PG AMP
C-FG1
CAPSTAN DRIVE (MC-VS)
HEAD DRUM DRIVE (MH-VS)
C-FG
CAPSTAN MOTOR
HEAD DRUM MOTOR
D-FG
D-PG
MECHANISM
CTL REC/PB AMP
STILL·SLOW 13
REC CTL IN 12
REMARK 11
CTL PB OUT 15
STL SHAPE
THRESH HOLD SEL
SW LOGIC
TRAP
REC AMP
AGC DET
AGC AMP
CTL CHECK
CTL HEAD
8DS1-11900A

AUDIO CIRCUIT BASIC BLOCK DIAGRAM


IC202
AV(LINE)AUDIO IN
TUNER AUDIO IN
EXT H
AUDIO INPUT SIGNAL
PB EQ
LP ON
EQUALIZE AMP
C2008,R2006
LPF
VR202
PB LEVEL
IC201 (LA7294)
EE MUTE
ALC
ALC DET
PB MUTE
REC
EE
PB
LINE AMP
POWER ON/OFF MUTE
MUTING CONTROL
C2009,R2009
ATTACK RECOVERY TIME CR
R2010,R2011
ALC LEVEL
AUDIO OUTPUT
AD MUTE
MECHANISM BOLCK
AUDIO R/P HEAD
REC AMP
REC MUTE
R2013 R2012
REC LEVEL
VR201
CURRENT BIAS ADJ
L2002
C2013 R2014
PEAKING
LP CONTROL
LP H
REC/EE CONTROL
REC H
PB/EE CONTROL
PB H
T2001
Q2001
70kHz OSC
AUDIO E HEAD
FULL E HEAD
RUSH CURRENT PROTECT
RIPPLE FILTER
SWD 12V
2
7
4
3
17
13
15
21
9
4
3
20
1
8
22
25
23
27
29
30
12
24
14
2
10
BDA1-11900


VP-1
IC181 (LA7320) REC/PRE.AMP
HEAD DRUM
CH1
V-HEAD
CH2
R.T
R.T
AMP
AMP
SW
REC ON
L
H
RF SW P
REC CURRENT CHECK
ENV.OUT
RF.
ENVELOPE OUT
Q1801~Q1803
EQ AMP
PB Y-FM
VR181
REC-Y
FILTER
CURRENT AMP
Y/C MIX AMP
PB ON
RF SWITCHING PULSE
RF SW P
PB EE
PB EE 5V
REC
REC 12V
PB.EE 5V
L1006,L1005
L1029,C1047
L.P.F
BUFFER
Q1004,Q1006
PB C
PB C
PB C
IC161 (BA7021) INPUT SELECT
AV VIDEO IN
TUNER VIDEO IN
MUTE
INPUT VIDEO SIG.
PB H
EXT H
VR182
REC.C
Q1101
BUFFER
XF111(2/3)
1.4MHZ L.P.F
REC C
RF SW P
DOR H
19
16
18
3
13
14
1
5
6
2
11
26
29
30
7
9
32
1
3
6
8
2
4
7
3
5

VIDEO CIRCUIT BASIC BLOCK DIAGRAM


VD-A (MAIN BOARD CP-1)
IC101 (LA7340) Y-SIGNAL PROCESS
VD-A (MAIN BOARD CP-1)
IC103 (LA7330) CHROMA PROCESS
18 REC CURRENT CHECK
RF. 3 ENVELOPE OUT
Q1801-Q1803
EQ AMP
PB Y-FM 26
P.B
FM IN
FM AGC
8MHZ H.P.F
LIM
3MHZ L.P.F
MIX
FM DEMOD.
L.P.F
L.P.F 3MHZ
D.O.C DET.
DL
AMP
AGC 2
P.B
REC
VR103 P.B LEVEL
XF101 L.P.F 3MHZ
Q1002,Q1003 AMP.
Q1001 BUFF.
CLAMP
CLAMP
Q1005 BUFFER
VR111 N.C.ADJ
L1004,L1003 C1037-C1039 L.P.F
CCD 1H-DL
X2FSC
IC102
CORRELATION
AMP
LIM
LIM
D.O
NORMAL
D.O.C & NOIS CANCELL
P.B Y
NL DE-EMPHA
NOISE CANCELL
PICTURE CONTROL
6dB AMP
Y/C MIC
SYNC AMP
F.B. CLAMP
VIDEO AMP
DRIVE
VIDEO OUT
21
Q1603 BUFFER
VIDEO OUT TO AV
Q1604,Q1605 EQ
VIDEO OUT TO RF-CONV.
D.O.C PULSE
AGC
AGC 1 DET
DELAY
SYNC SEP.
L.P.F
P.B CHROMA
MUTE OR VD-INSART
29
VR181 REC-Y
5 FILTER
30 REC FM OUT
REC (Y-FM)
1/2 fH CARRIER SHIFT
FM MODULATOR
5V DC
VR101 CARRIER
VR102 DEV.
WHITE/ DARK CLIP
MAIN EMPHASIS
NL EMPHA
DETAIL EMPHA
REC(Y)
ATT
AGC. AMP
REC (VIDEO Y/C)
REC/EE VIDEO IN
SYNC OUT
CONTROL IN
CHROMA IN
VD IN
24 17 18 19 20
VIDEO SIGNAL IN
6
2 PB EE 5V
11 REC 12V
V-LOCK PULSE (VLP) IN FROM SERVO
PICTURE CONTROL VR
COMPOSITE SYNC. TO SERVO
PB.EE 5V
L1006,L1005 L1029,C1047 L.P.F
BUFFER Q1004,Q1006
PB C
VR182 REC.C
PB C
Q1101 BUFFER
XF111(2/3) 1.4MHZ L.P.F
REC C
PB CHROMA IN
6dB AMP
A.C.C AMP.
BURST EMPHA DE-EMPHA
CARRIER BALANCE
MAIN CONVERTER
627KHZ
REC 4.43MHZ
4.43MHZ
5.06MHZ
R/P
R/P DET
A.C.C DET.
REC CHROMA OUT
KILLER
627KHZ
REC-C
VIDEO IN
XF111(1/3) 4.43MHZ B.P.F
Q1102-Q1105 AMP
DL111 COMB FILTER
AMP
P.B ACK
P.B CHROMA OUT
KILLER
REC-C
VR104 SWD 5V EE LEVEL
P.B CHROMA
XF111 (3/3) 5.06MHZ B.P.F
KILLER
ACK DET.
SW
REC APC
CONTROL
4.43MHZ VXO
4.43MHZ XO
4.43MHZ CW
4.43MHZ X-TAL X1101
BURST ID-DET.
REC AFC
PB APC
4.43MHZ CW
3:4 LOCK PROTECT
FSC
Q1103 BUFFER
4.43MHZ FSC SIGNAL TO SERVO
SUB CONVERTER
CW 4.43MHZ
627KHZ
RF SW P 32 SIGNAL DET.
LP
SW 25
SW 25
90° PHASE SHIFT (PS)
8-ID
HD
8-ID LOGIC
X2
X2FSC TO IC102 1H-DL
BGP 2
PULSE GEN.
C-SYNC IN
BGP 1
5.06MHZ
1/8
5.06MHZ VCO
CONTROL
R1102,R1104 C1105,C1106 INTEG-RATION
MISLOCK OUT
PB SLD
PLL LOCK
DOP H 1 N/P/S DET.
8DV1-11989/E

SLV-2

IC301 (LC66508B) SYSTEM CONTROL MPU PIN FUNCTIONS TABLE

Pin No.	Name	I/O	I/O Signal Function
1	SSB DATA	I	Mode data communication pin to other microprocessor. Data is 8 bit × 12 block serial data. Clock pulse is output from this microprocessor.
2		O	
3.	SSB CLK	O	
4	0/1 CLK	I	CTL head REC/PB pulse signal input.
5	SIMPLE ENDLESS PLAY	I	Option setting pin for repeat playback function.
6	–	–	
7	4K-PWM	O	PWM signal output (4 kHz) during specified period when starting FF/REW mode. (Capstan motor drive)
8	HOLD		+ 5V
9	SW DATA 1	I	Mechanism position indication switch.
10	SW DATA 2	I	
11	SW DATA 3	I	
12	E.P. SW	I	Switch input for determination whether cassette recording is possible or not.
13	–	–	
14	PAL	I	PAL/NTSC system setting pin. "L" is for PAL.
15	CTL GAIN DOWN	O	Gain switching signal for CTL AMP circuit. Output during fast forward.
16	MC-BR	O	Brake timing control signal output for capstan motor.
17	REW-REC O.P.T	I	Option setting pin for repeat recording function.
18	SV S.DATA	O	Serial data output to servo IC
19	SV S.CLK	O	Serial clock output to servo IC
20	–	–	
21	–	–	
22	–	–	
23	–	–	
24	–	–	
25	–	–	
26	–	–	
27	–	–	
28	FF + REW	O	"H" output during FF/REW mode.
29	RF SW P.	I	Input terminal for video head switching pulse (RF SW P).
30	TEST		GND
31	VSS		GND
32	OSC 1		MPU clock oscillation pin. Clock frequency is 4 MHz.
33	OSC 2		
34	RESET	I	For MPU initial setting.
35	DOC P.	I	Video head envelope detection signal input. Used for noise advance operation function.
36	SP/LP OPTION	I	Feature of tape speed setting pin. "L" is for model of SP mode only.
37	C.FG P.	I	0 to approx. 6 kHz pulse. Frequency needed for recognition is approx. 300 Hz.
38	ML-F	O	FWD direction loading indication signal. (FL, TL)
39	ML-R	O	RVS direction loading indication signal. (FL, TL)
40	ML-L	O	Loading low speed indication signal.
41	ML-M	O	Loading medium speed indication signal.
42	REC H	O	Recording indication signal.
43	PB H	O	Playback screen output indication signal.
44	STILL + SLOW + X2S	O	Output during STILL, SLOW, X2S modes.
45	SPECIAL PLAY	O	Output during special playback modes. (CUE, REV, STILL, SLOW, F • ADV, A • DUB, PAUSE)
46	ANT/VIDEO	O	ANT/VIDEO switching signal.
47	–	–	
48	–	–	
49	V-REF	I	For reference voltage for comparator in the microprocessor.
50	REEL P.	I	(0 to approx. 300 Hz pulse) reel table rotation cycle detection signal input. Used for determination of tape winding OK/NG.
51	DEW S.	I	Dew detection signal input.
52	TAPE TOP S.	I	Tape winding start detection signal input.
53	TAPE END S.	I	Tape winding stop detection signal input.
54	FL SW	I	Front loading mechanism switch. (3 inputs : LOW — cassette OUT ; MID — during FL ; HIGH — cassette insertion completed)
55	TAPE SPEED	I	Tape speed determination at SERVO. (HIGH — LP ; LOW — SP)
56	A • MUTE	O	AUDIO output prohibition indication signal
57	A • REC MUTE	O	NORMAL audio output and recording prohibition indication signal
58	–	–	
59	–	–	
60	–	–	
61	POWER UP	O	Always output except during power OFF.
62	–	–	
63	CAP. MOTOR OPTION	I	Capstan motor type setting pin.
64	VDD		Power supply for + 5V microprocessor.

P66508B

IC351 (LC7416) DIGITAL SERVO IC PIN FUNCTIONS TABLE

Pin No.	I/O Terminal Name	I/O	Input/Output Function
1	FSC IN	I	Input for the IC internal system clock pulse. A level of at least 0.3 Vp-p is required. The color subcarrier signal is input by capacitive coupling.
2	V_{SS}		Ground
3	C-SYNC	I	Composite sync signal input.
4	VD	O	Dummy V_D signal output.
5	NC	—	NC
6	NC	—	
7	RF-SW-PULSE	O	Video head switching pulse output.
8	AF-SW-PULSE	O	Audio head (FM) switching pulse output.
9	DL1	I	Dummy V_D insertion position control CR.
10	CTL-IN	I	Control signal input.
11	REMAK	O	Outputs the control signal re-recording control signal. Three-value output (H, M, L).
12	REC-CTL	O	Recording control signal output. Three-value output (H, OPEN, L).
13	NC	—	NC
14	D-PG. MM	I	CR for drum PG signal delay.
15	D-PG	I	Drum PG signal input.
16	NC	—	NC
17	D-FG	I	Drum FG signal input.
18	DSE	O	Outputs the speed error for drum system speed control. An output making the drum motor stop is delivered when DRUM-ON is "0". The lower three bits of the output data forms R-2R ladder network and the 4th bits for DAC (D/A Converter) and upper 5th to 8th bits for PWM (Pulse Width Modulation).
19	FHE	O	Outputs the horizontal sync signal of the composite sync signal after F-V conversion (using the drum phase control system). The lower three bits of the output data forms R-2R ladder network and the 4th bits for DAC (D/A Converter) and upper 5th to 8th bits for PWM (Pulse Width Modulation).
20	DPE		Error output for drum system phase control. The lower three bits of the output data forms R-2R ladder network and the 4th bits for DAC (D/A Converter) and upper 5th to 8th bits for PWM (Pulse Width Modulation).
21	C-START/STP	O	Outputs the capstan motor start and brake pulses in the slow mode.
22	CSE	O	Capstan system speed error output. An output making the capstan motor stop is delivered when CAP-ON is "0". The lower three bits of the output data forms R-2R ladder network and the 4th bits for DAC (D/A Converter) and upper 5th to 8th bits for PWM (Pulse Width Modulation).
23	CPE	O	Capstan system phase reciprocal error output. The lower three bits of the output data forms R-2R ladder network and the 4th bits for DAC (D/A Converter) and upper 5th to 8th bits for PWM (Pulse Width Modulation).
24	$\overline{F}$/R	O	Capstan motor forward/reverse control output. "1" sets the reverse mode, and "0" the forward mode.
25	C-FG1	I	Capstan FG signal input.
26	NC	—	NC
27	NC	—	NC
28	EP/LP/SP	O	Recording mode output. Three-value output ("H" is for EP mode, "M" for LP mode and "L" for SP mode).
29	SP	O	Recording mode output. "H" is for SP mode.
30	CAP-BRK	I	Control input for capstan brake timing. (MC-BR)
31	TRK-CR	I	CR for tracking adjustment.
32	NC	—	NC
33	D-WD1	I	CR for drum compensation timing adjustment in the slow mode.
34	NC	—	NC
35	REF-TRK	O	Outputs the tracking delay input signal.
36	MODE (×2+STILL)	O	Mode decoding signal output. At the ×2 SPEED mode and starting time of SLOW/STILL mode, output "H" level.
37	NC	—	NC
38	1/0-CK	O	Outputs the CTL signal for realtime counter.
39	SV-S・CLK	I	Serial transmission clock pulse input.
40	SV-S・DATA	I	Serial data input terminal.
41	NTSC/$\overline{PAL}$	I	NTSC/PAL switching input. "H" is for NTSC, "L" for PAL.
42	V_{DD}		+5V supply terminal

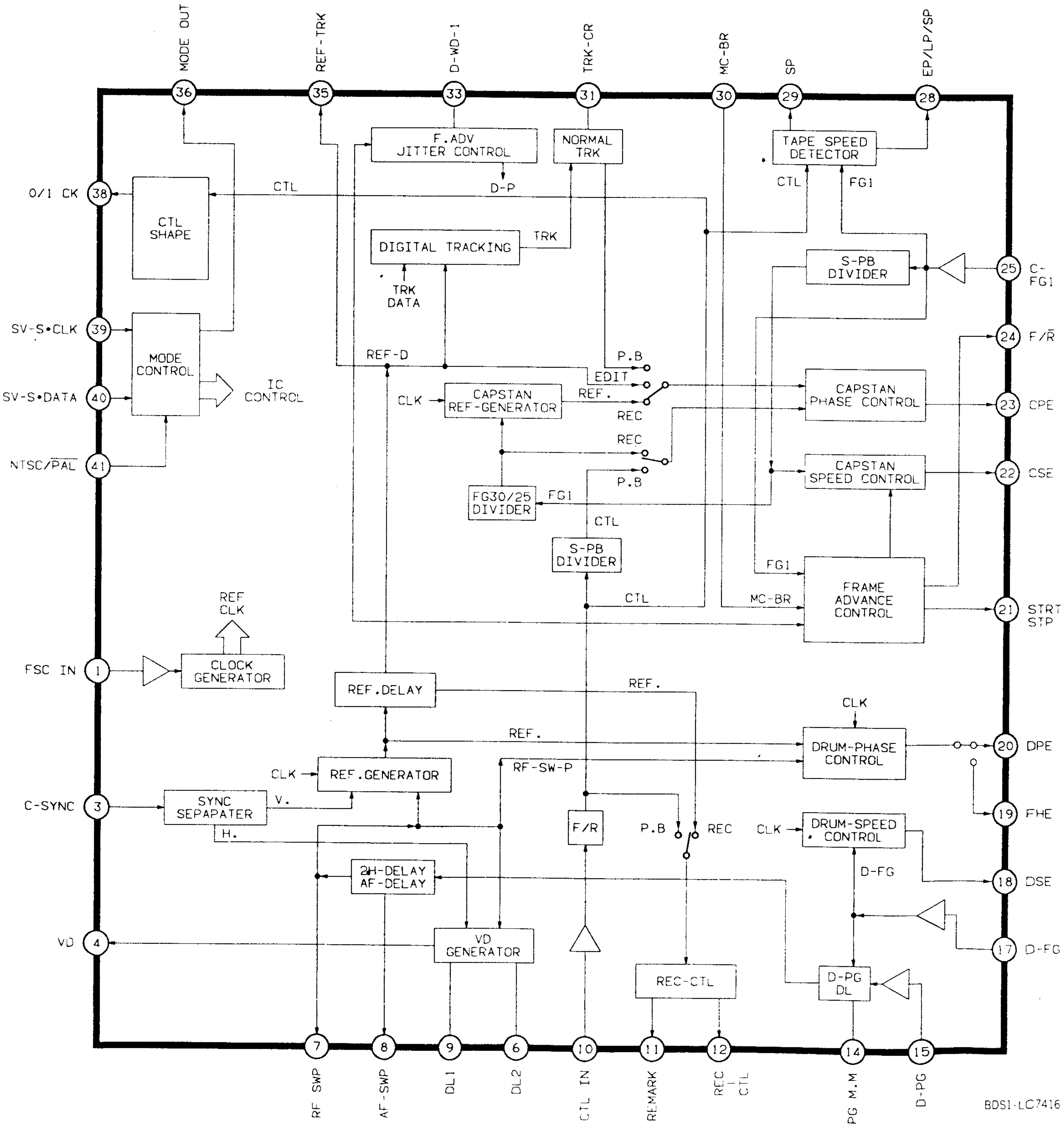
IC711 (M50957) TIMER MPU PIN FUNCTIONS TABLE

Pin No.	Port	Input/Output Signal	I/O	Input/Output Function
1	Vcc			+ 5V
2	$P6_5$	AV	O	"H" output when an external input is received.
3	$P6_4$	SC	O	"H" during simulcast.
4	$P6_3$/PWM3	BAND1	O	Band data output (BAND1, BAND2) (L, L) = VHF-LOW (L, H) = VHF-HIGH (H, L) = UHF (H, H) = SKIP
5	$P6_2$/PWM2	BAND2	O	
6	$P6_1$/PWM1	PWM	O	Tuning voltage output.
7	$P6_0$/T	ADJUST	O	Pulse output (6.29MHz/128) for clock frequency adjustment.
8	$P2_7$	$\overline{\text{CLK}}$	O	Clock pulse output to the E^2 PROM.
9	$P2_6$	DI	I/O	Data exchange with the E^2 PROM.
10	$P2_5$	$\overline{E^2\ \text{PROM CS1}}$	O	E^2 PROM 1 is accessed when "L".
11	$P2_4$	BG/$\overline{\text{L}}$	O	Transmission system switching ("H" = PAL BG ; "L" = SECAM L).
12	$P2_3$	NC		NC
13	$P2_2$	TUNER ON	O	"H" output when tuner power is ON.
14	$P2_1$	$\overline{\text{AUDIO MUTE}}$	O	"L" output during AUDIO MUTE.
15	$P2_0$	AFT MUTE	O	"H" output during AFT MUTE.
16	$P3_7$/$\overline{\text{Srdy}}$	$\overline{\text{POWER DOWN}}$	O	Power failure mode set at "L" input.
17	$P3_6$/CLK	$\overline{\text{S.CLK}}$	I	SSB clock pulse input.
18	$P3_5$/Sout	$\overline{\text{S.OUT}}$	O	SSB data output.
19	$P3_4$/Sin	S.IN	I	SSB data input.
20	$P3_3$/ANin	AFT.C	I	AFT.S curve input.
21	$P3_2$/CNTR	H.SYNC	I	Horizontal sync signal input for existence channel discrimination.
22	$P3_1$	SCL	O	Clock pulse output to the VPS decoder IC.
23	$P3_0$	SDA	I/O	Data exchange with the VPS decoder IC.
24	$P5_3$/INT_1	V. SYNC	I	Vertical sync signal input for existence channel discrimination.
25	$P5_2$/INT_2	REMOCON	I	Remote control signal input.
26	CNVss			Ground.
27	$\overline{\text{RESET}}$			Reset terminal.
28	Xin			6.291456MHz clock terminal.
29	Xout			
30	Xcin			32.768kHz (clock OSC used in the power failure mode)
31	Xcout			
32	Vss			Ground
33	φ			
34	$P5_7$	KEY IN4	I	Key inputs
35	$P5_6$	KEY IN3	I	
36	$P5_5$	KEY IN2	I	
37	$P5_4$	KEY IN1	I	
38	Vp	Vp		-30V
39	$P5_1$	NC	—	NC
40	$P5_0$	NC	—	NC
41	$P1_7$	o	O	Display segment outputs. (Included key-scan output)
42	$P1_6$	n	O	
43	$P1_5$	m	O	
44	$P1_4$	l	O	
45	$P1_3$	k	O	
46	$P1_2$	j	O	
47	$P1_1$	i	O	
48	$P1_0$	C9	O	Display grid outputs.
49	$P0_7$	C8	O	
50	$P0_6$	C7	O	
51	$P0_5$	C6	O	
52	$P0_4$	C5	O	
53	$P0_3$	C4	O	
54	$P0_2$	C3	O	
55	$P0_1$	C2	O	
56	$P0_0$	C1	O	
57	$P4_7$	h	O	Display segment outputs. (Included key-scan output)
58	$P4_6$	g	O	
59	$P4_5$	f	O	
60	$P4_4$	e	O	
61	$P4_3$	d	O	
62	$P4_2$	c	O	
63	$P4_1$	b	O	
64	$P4_0$	a	O	

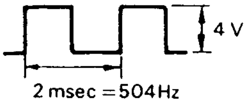
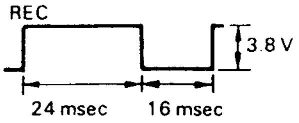
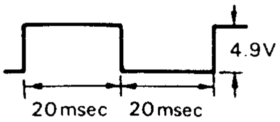
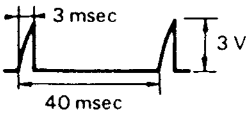
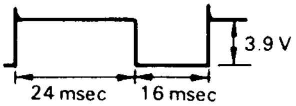
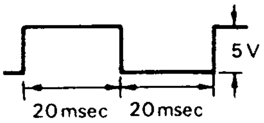
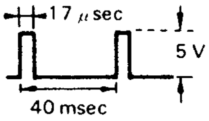
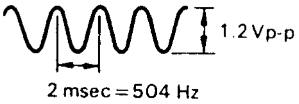
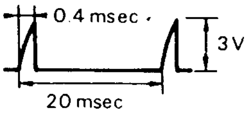
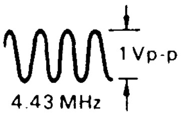
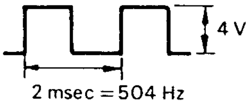
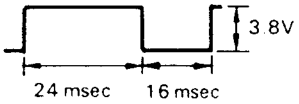
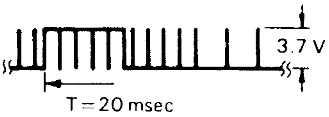
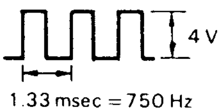
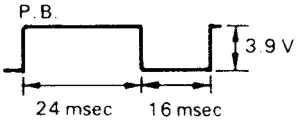
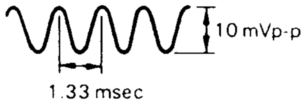
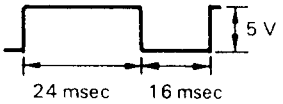
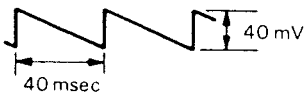
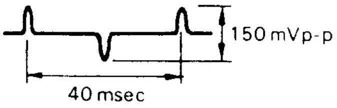
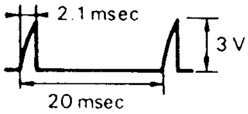
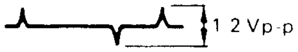
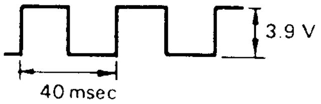
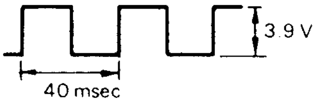
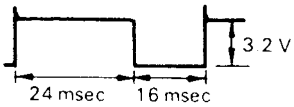
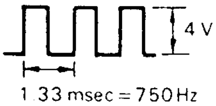
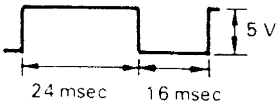
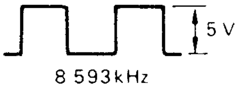
P50957

SLV-252EE

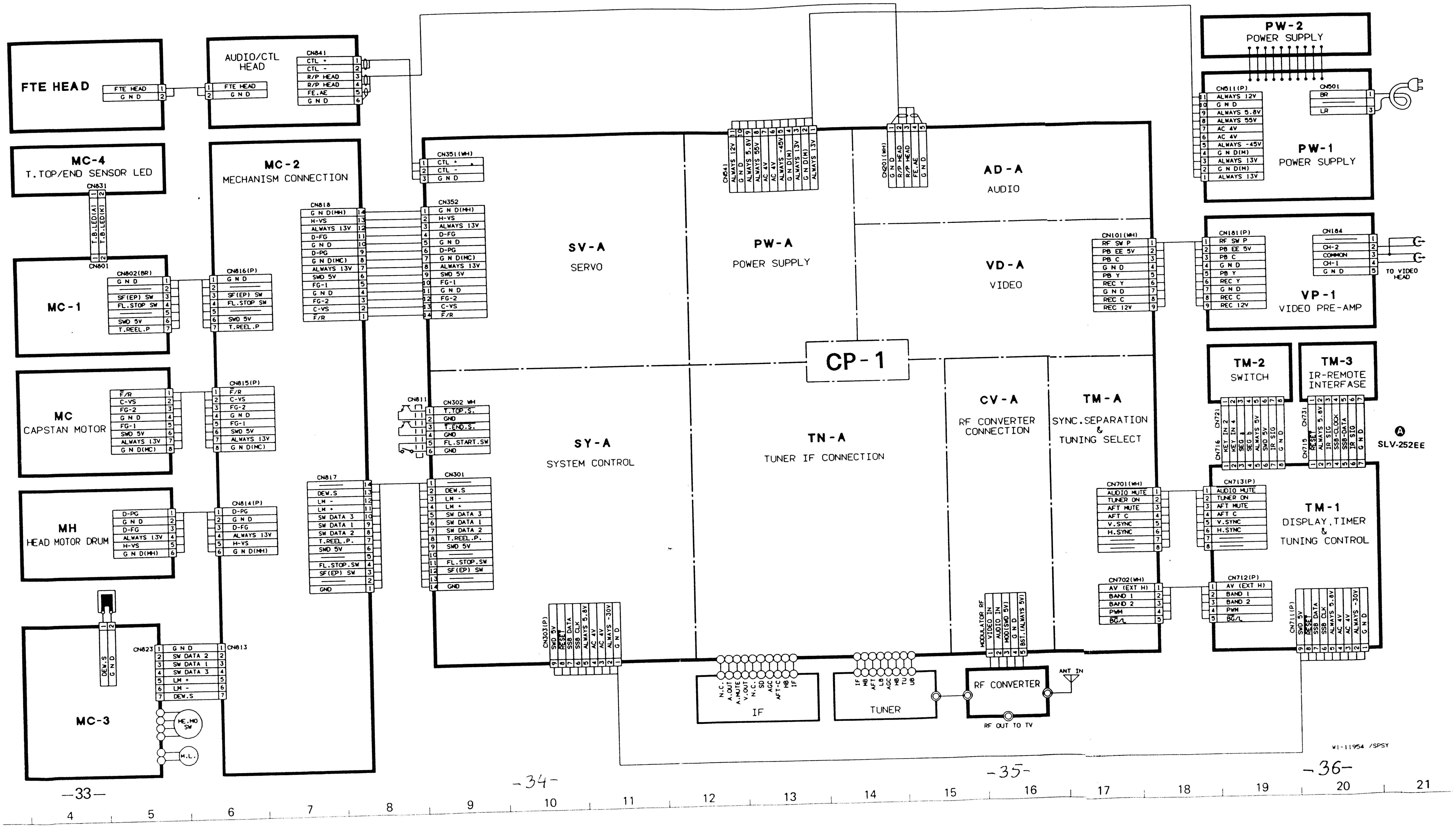
IC351 (LC7416) DIGITAL SERVO IC INTER BLOCK DIAGRAM


MODE OUT
REF-TRK
D-WD-1
TRK-CR
MC-BR
SP
EP/LP/SP
36
35
33
31
30
29
28
F.ADV JITTER CONTROL
NORMAL TRK
TAPE SPEED DETECTOR
0/1 CK
38
CTL
D-P
CTL
FG1
CTL SHAPE
DIGITAL TRACKING
TRK
TRK DATA
S-PB DIVIDER
C-FG1
25
SV-S•CLK
39
MODE CONTROL
24
F/R̄
REF-D
P.B
EDIT
SV-S•DATA
40
IC CONTROL
CLK
CAPSTAN REF-GENERATOR
REF.
REC
CAPSTAN PHASE CONTROL
23
CPE
REC
NTSC/PAL̄
41
P.B
CAPSTAN SPEED CONTROL
22
CSE
FG30/25 DIVIDER
FG1
CTL
S-PB DIVIDER
FG1
FRAME ADVANCE CONTROL
CTL
MC-BR
21
STRT STP
REF CLK
FSC IN
1
CLOCK GENERATOR
REF.DELAY
REF.
CLK
REF.
DRUM-PHASE CONTROL
20
DPE
CLK
REF.GENERATOR
RF-SW-P
19
FHE
C-SYNC
3
SYNC SEPAPATER
V.
H.
F/R
P.B
REC
CLK
DRUM-SPEED CONTROL
2H-DELAY AF-DELAY
D-FG
18
DSE
VD
4
VD GENERATOR
17
D-FG
REC-CTL
D-PG DL
7
8
9
6
10
11
12
14
15
RF SWP
AF-SWP
DL1
DL2
CTL IN
REMARK
REC-CTL
PG M.M
D-PG
BDS1-LC7416

WAVEFORM OF SERVO CIRCUIT

IC351 (LC7416)		㉕	 4 V 2 msec = 504Hz	⑮	REC  3.8 V 24 msec 16 msec
⑦	 4.9V 20msec 20msec	㉛	 3 msec 3 V 40 msec		P.B.  3.9 V 24 msec 16 msec
⑧	 5 V 20msec 20msec	㊳	 17 μsec 5 V 40 msec	㉔ ㉖	 1.2 Vp-p 2 msec = 504 Hz
⑨	 0.4 msec 3 V 20 msec	①	 1 Vp-p 4.43 MHz	㉓	 4 V 2 msec = 504 Hz
⑩	REC  3.8V 24 msec 16 msec	③	 3.7 V T = 20 msec	㉗	 4 V 1.33 msec = 750 Hz
	P.B.  3.9 V 24 msec 16 msec	**IC352 (LA7123)**		㉘	 10 mVp-p 1.33 msec
⑫	REC  5 V 24 msec 16 msec	③	P.B.  40 mV 40 msec	㉙	 150 mVp-p 40 msec
⑭	 2.1 msec 3 V 20 msec	④	P.B. 	㉚	
⑮		⑦ ⑧	REC  3.2 V 24 msec 16 msec		
⑰	 4 V 1.33 msec = 750Hz	⑫	 5 V 24 msec 16 msec		
⑱ ⑳ ㉒ ㉓					

OVERALL WIRING DIAGRAM


FTE HEAD
FTE HEAD
G N D
AUDIO/CTL HEAD
CN841
CTL +
CTL -
R/P HEAD
R/P HEAD
FE.AE
G N D
MC-4
T.TOP/END SENSOR LED
CN831
T.B.LED(A)
T.B.LED(K)
CN801
MC-1
CN802(BR)
SF(EP) SW
FL.STOP SW
SWD 5V
T.REEL.P
MC-2
MECHANISM CONNECTION
CN816(P)
CN818
G N D(MH)
H-VS
ALWAYS 13V
D-FG
D-PG
G N D(MC)
FG-1
FG-2
C-VS
F/R
MC
CAPSTAN MOTOR
CN815(P)
ALWAYS 13V
G N D(MC)
MH
HEAD MOTOR DRUM
CN814(P)
D-PG
D-FG
G N D(MH)
CN817
DEW.S
LM -
LM +
SW DATA 3
SW DATA 1
SW DATA 2
T.REEL.P.
SWD 5V
FL.STOP.SW
SF(EP) SW
GND
MC-3
CN823
CN813
DEW.S
ME.MO SW
M.L.
CN351(WH)
CN352
CN811
CN302 WH
T.TOP.S.
T.END.S.
FL.START.SW
CN301
SV-A
SERVO
SY-A
SYSTEM CONTROL
CN303(P)
RESET
SSB DATA
SSB CLK
ALWAYS 5.8V
AC 4V
ALWAYS -30V
CN541
ALWAYS 12V
ALWAYS 5.8V
ALWAYS 55V
ALWAYS -45V
G N D(M)
ALWAYS 13V
PW-A
POWER SUPPLY
CN201(WH)
AD-A
AUDIO
VD-A
VIDEO
CP-1
TN-A
TUNER IF CONNECTION
CV-A
RF CONVERTER CONNECTION
TM-A
SYNC.SEPARATION & TUNING SELECT
CN101(WH)
RF SW P
PB EE 5V
PB C
PB Y
REC Y
REC C
REC 12V
CN701(WH)
AUDIO MUTE
TUNER ON
AFT MUTE
AFT C
V.SYNC
H.SYNC
CN702(WH)
AV (EXT H)
BAND 1
BAND 2
PWM
BG/L
MODULATOR RF
VIDEO IN
AUDIO IN
MOD(SWD 5V)
BST.(ALWAYS 5V)
N.C.
A.OUT
A.MUTE
V.OUT
SD
AGC
AFT-C
HB
IF
AFT
LB
TU
UB
TUNER
RF CONVERTER
ANT IN
RF OUT TO TV
PW-2
POWER SUPPLY
CN511(P)
AC 4V
CN501
BR
LR
PW-1
POWER SUPPLY
CN181(P)
CN184
CH-2
COMMON
CH-1
TO VIDEO HEAD
VP-1
VIDEO PRE-AMP
TM-2
SWITCH
TM-3
IR-REMOTE INTERFASE
CN721
CN716
KEY IN 2
KEY IN 1
SEG
ALWAYS 5V
IR SIG
CN731
CN715
SSB-CLOCK
SSB-DATA
Ⓐ
SLV-252EE
TM-1
DISPLAY,TIMER & TUNING CONTROL
CN713(P)
CN712(P)
CN711(P)
WI-11954 /SPSY
4
5
6
7
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10
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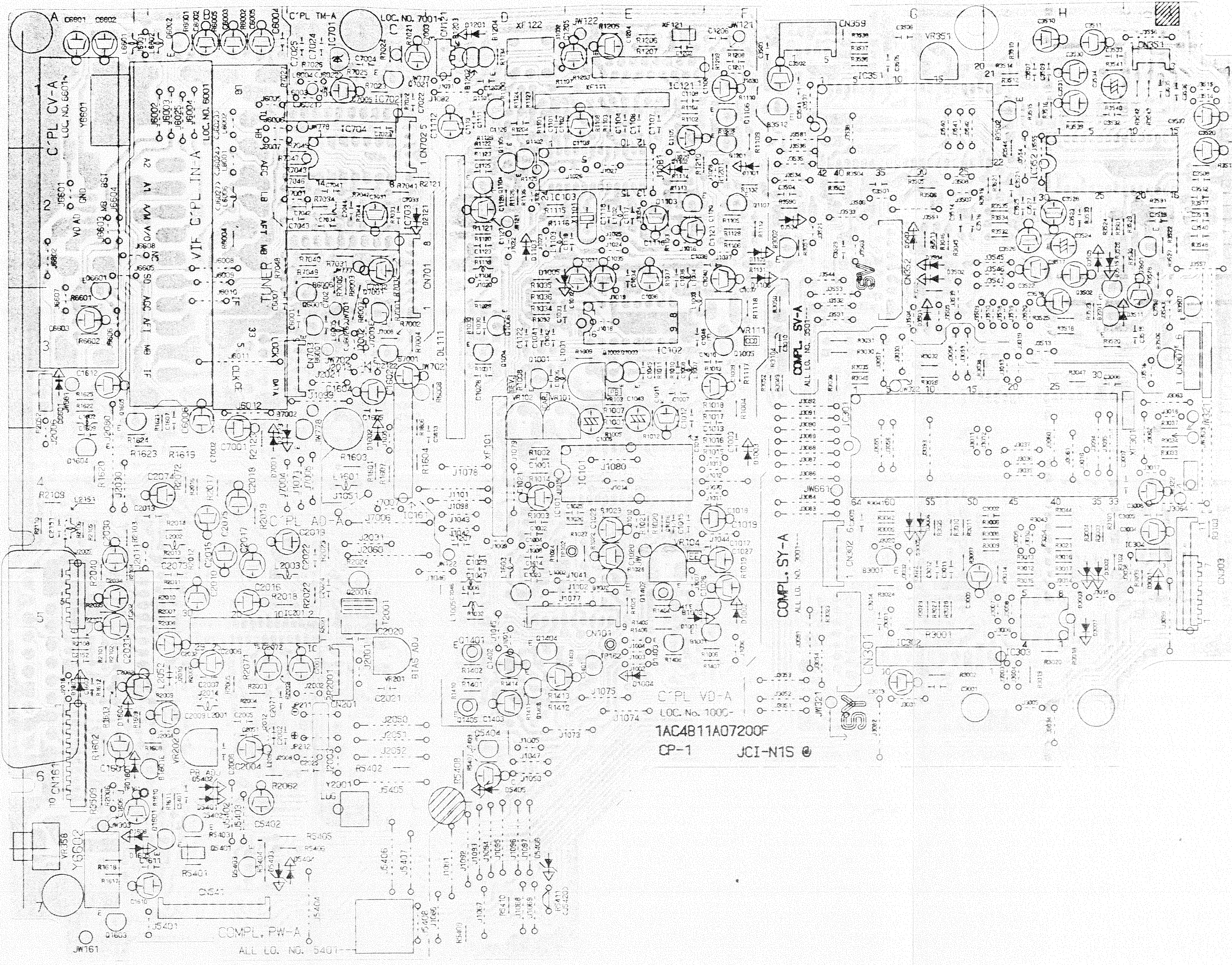
21

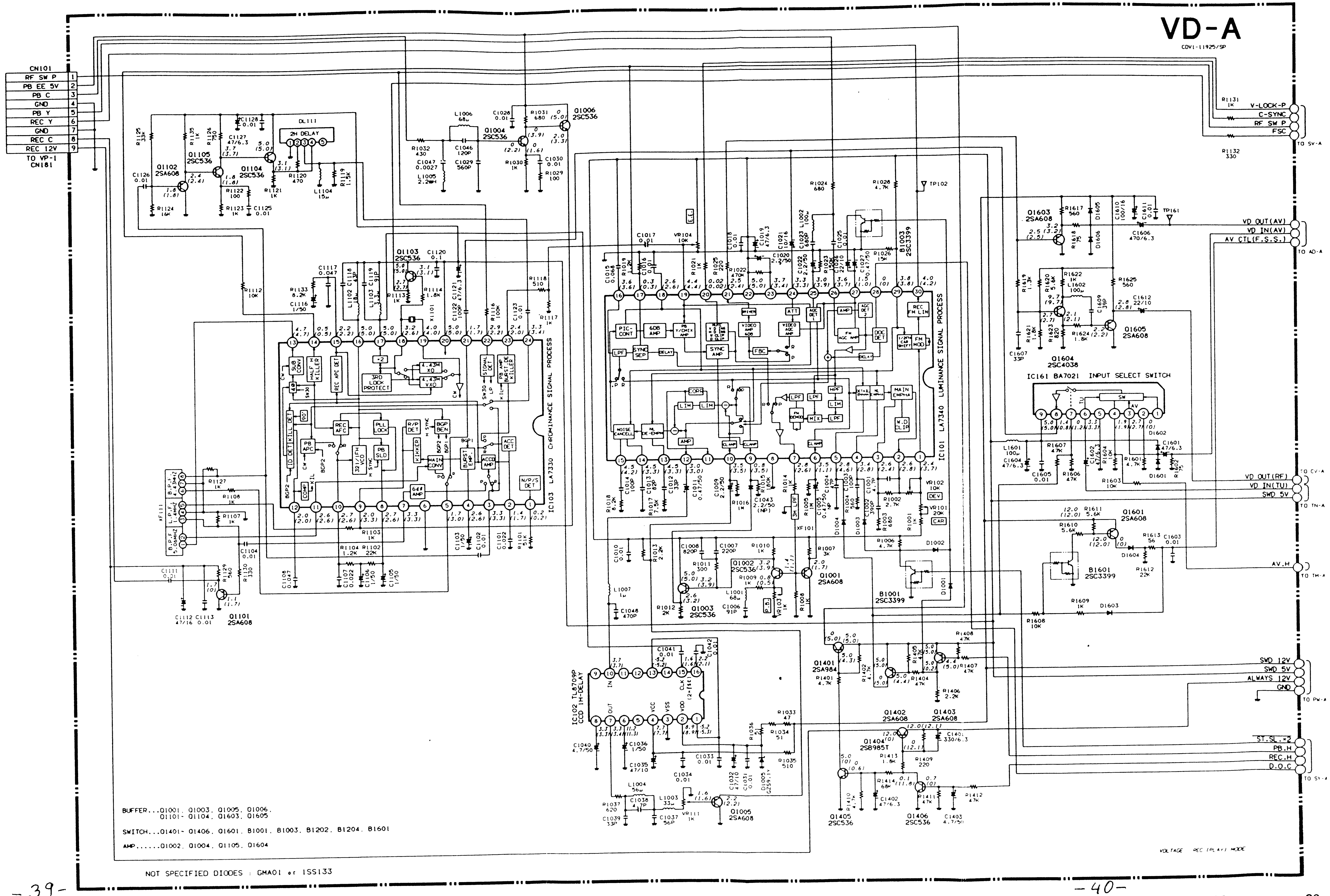
SECTION 4
PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

CP-1 MAIN P.C.B.

SLV-252EE


C'PL CV-A
LOC. NO. 6001-
C'PL IN-A
LOC. NO. 6001
VIF
TUNER
C'PL TM-A
LOC. NO. 7001-
IC701
IC704
CN701
IC121
IC103
IC102
IC101
IC351
CN359
VR351
COMPL. SY-A
ALL LO. NO. 3501-
IC301
IC302
CN301
COMPL. SY-A
C'PL AD-A
CN101
C'PL VD-A
LOC. No. 1000-
1AC4B11A07200F
CP-1
JCI-N1S
COMPL. PW-A
ALL LO. NO. 5401---
CN161
VR358

COMPL. CP-1 (VD-A) VIDEO CIRCUIT DIAGRAM


VD-A
CDV1-11925/SP
CN101
RF SW P
PB EE 5V
PB C
GND
PB Y
REC Y
GND
REC C
REC 12V
TO VP-1 CN181
DL111
2H DELAY
Q1102 2SA608
Q1105 2SC536
Q1104 2SC536
Q1004 2SC536
Q1006 2SC536
Q1103 2SC536
IC103 LA7330 CHROMINANCE SIGNAL PROCESS
IC101 LA7340 LUMINANCE SIGNAL PROCESS
IC102 TL8709P CCD 1H-DELAY
IC161 BA7021 INPUT SELECT SWITCH
Q1101 2SA608
Q1001 2SA608
Q1002 2SC536
Q1003 2SC536
Q1005 2SA608
B1001 2SC3399
B1003 2SC3399
Q1401 2SA984
Q1402 2SA608
Q1403 2SA608
Q1404 2SB985T
Q1405 2SC536
Q1406 2SC536
Q1601 2SA608
B1601 2SC3399
Q1603 2SA608
Q1604 2SC4038
Q1605 2SA608
V-LOCK-P
C-SYNC
RF SW P
FSC
TO SV-A
VD OUT(AV)
VD IN(AV)
AV CTL(F.S.S.)
TO AD-A
VD OUT(RF)
VD IN(TU)
SWD 5V
TO CV-A
TO TN-A
AV.H
TO TM-A
SWD 12V
SWD 5V
ALWAYS 12V
GND
TO PW-A
ST.SL.×2
PB.H
REC.H
D.O.C
TO SY-A
TP101
TP102
VOLTAGE REC (PLAY) MODE

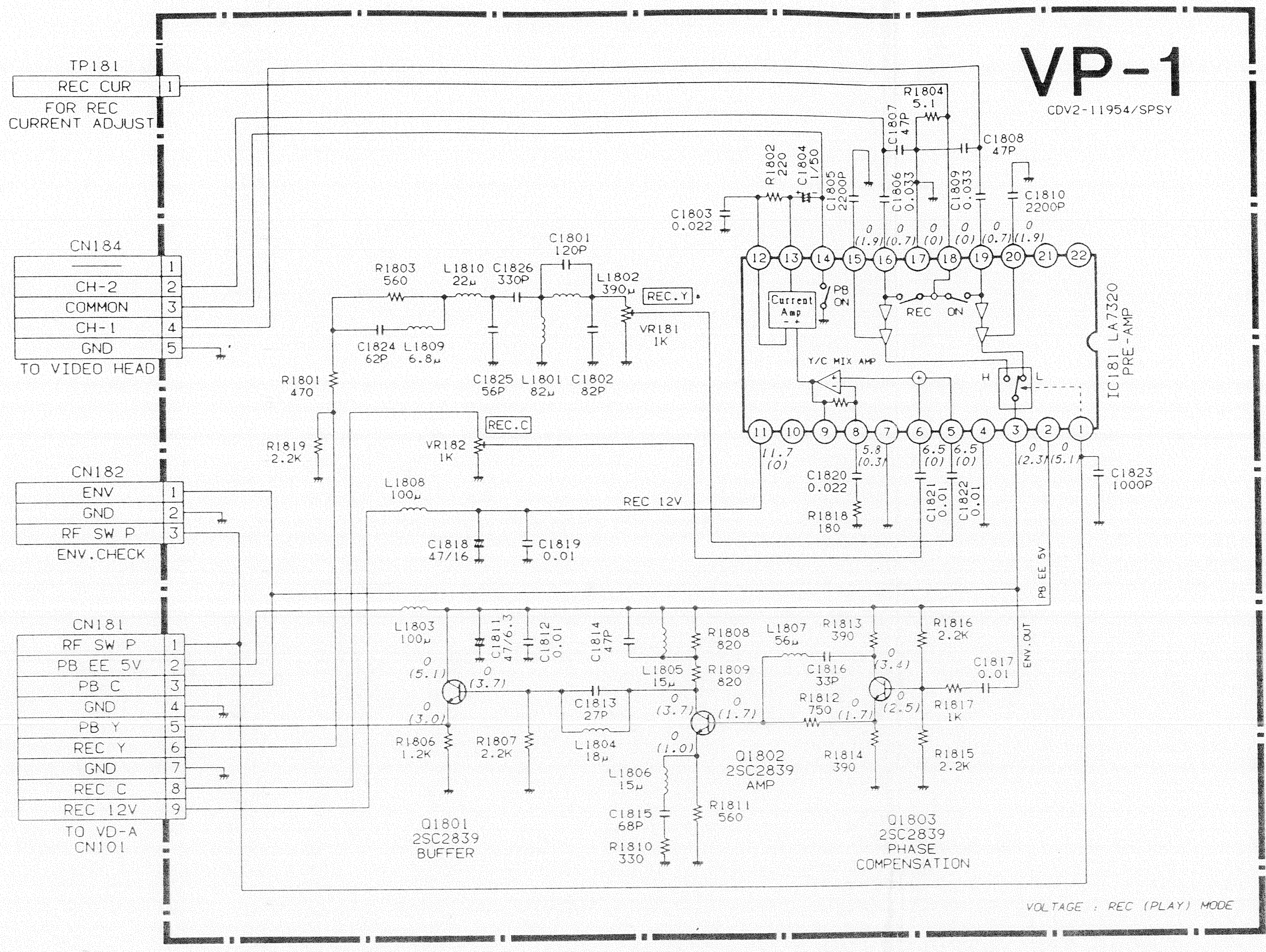
BUFFER...Q1001, Q1003, Q1005, Q1006,
Q1101- Q1104, Q1603, Q1605

SWITCH...Q1401- Q1406, Q1601, B1001, B1003, B1202, B1204, B1601

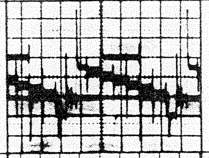
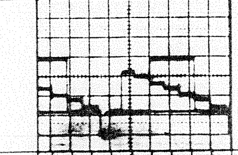
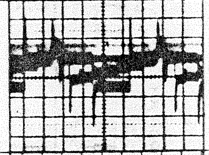
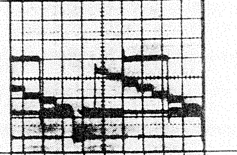
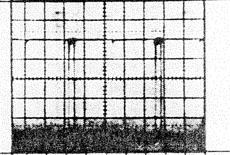
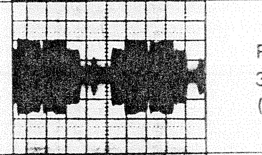
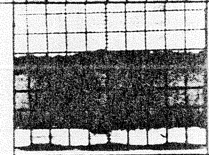
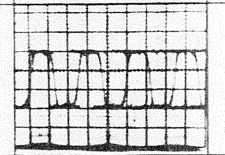
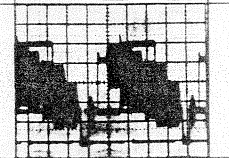
AMP......Q1002, Q1004, Q1105, Q1604

NOT SPECIFIED DIODES : GMA01 or 1SS133

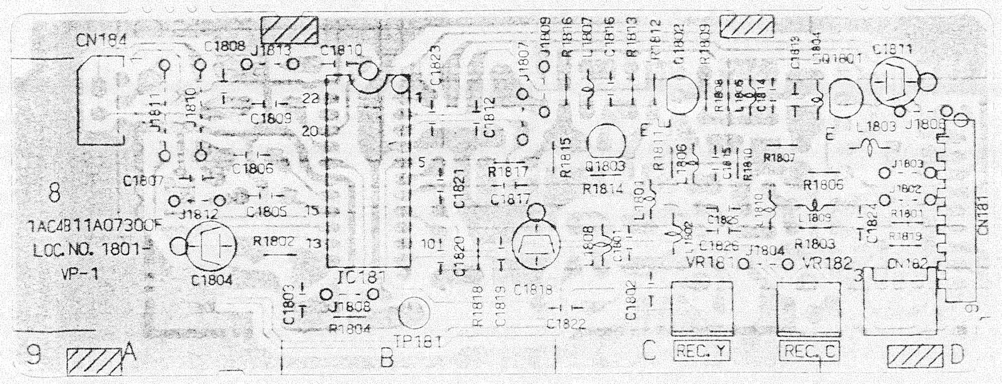
COMPL. VP-1 VIDEO PRE-AMP CIRCUIT DIAGRAM


VP-1
CDV2-11954/SPSY
TP181
REC CUR
FOR REC CURRENT ADJUST
CN184
CH-2
COMMON
CH-1
GND
TO VIDEO HEAD
CN182
ENV
GND
RF SW P
ENV.CHECK
CN181
RF SW P
PB EE 5V
PB C
GND
PB Y
REC Y
GND
REC C
REC 12V
TO VD-A CN101
IC181 LA7320 PRE-AMP
Current Amp
PB ON
REC ON
Y/C MIX AMP
REC.Y
REC.C
VR181 1K
VR182 1K
REC 12V
PB EE 5V
ENV OUT
Q1801 2SC2839 BUFFER
Q1802 2SC2839 AMP
Q1803 2SC2839 PHASE COMPENSATION
VOLTAGE : REC (PLAY) MODE

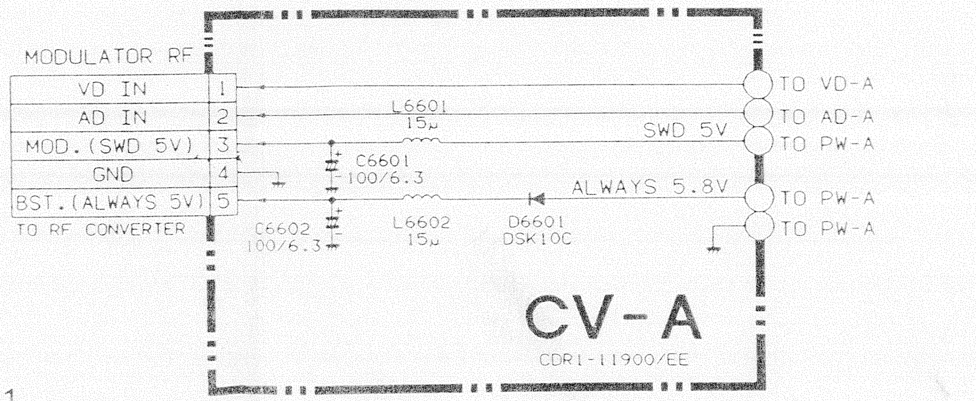
WAVEFORM OF VIDEO CIRCUIT

Pin No.		
IC101 (2)		REC 1.2 Vp-p (200 mV/div)
(6)		REC 500 m Vp-p (100 mV/div)
(6)		PLAY 300 m Vp-p (100 mV/div)
(9) (10)		PLAY 500 m Vp-p (100 mV/div)
(17)		4 Vp-p 15.625 KHz (1 V/div)
(19)		PLAY 320 m Vp-p (100 mV/div)
(26)		PLAY 400 m Vp-p (100 mV/div)
(30)		REC 1.5 Vp-p (500 mV/div)
TP161		PLAY 1 Vp-p (200 mV/div)

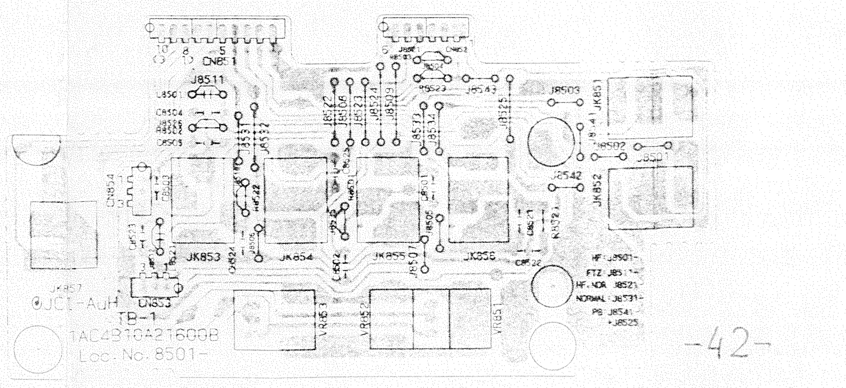
VP-1 VIDEO PRE-AMP P.C.B.


CN184
1AC4811A07300F
LOC.NO. 1801
VP-1
IC181
TP181
REC.Y
REC.C
VR181
VR182
CN181
CN182

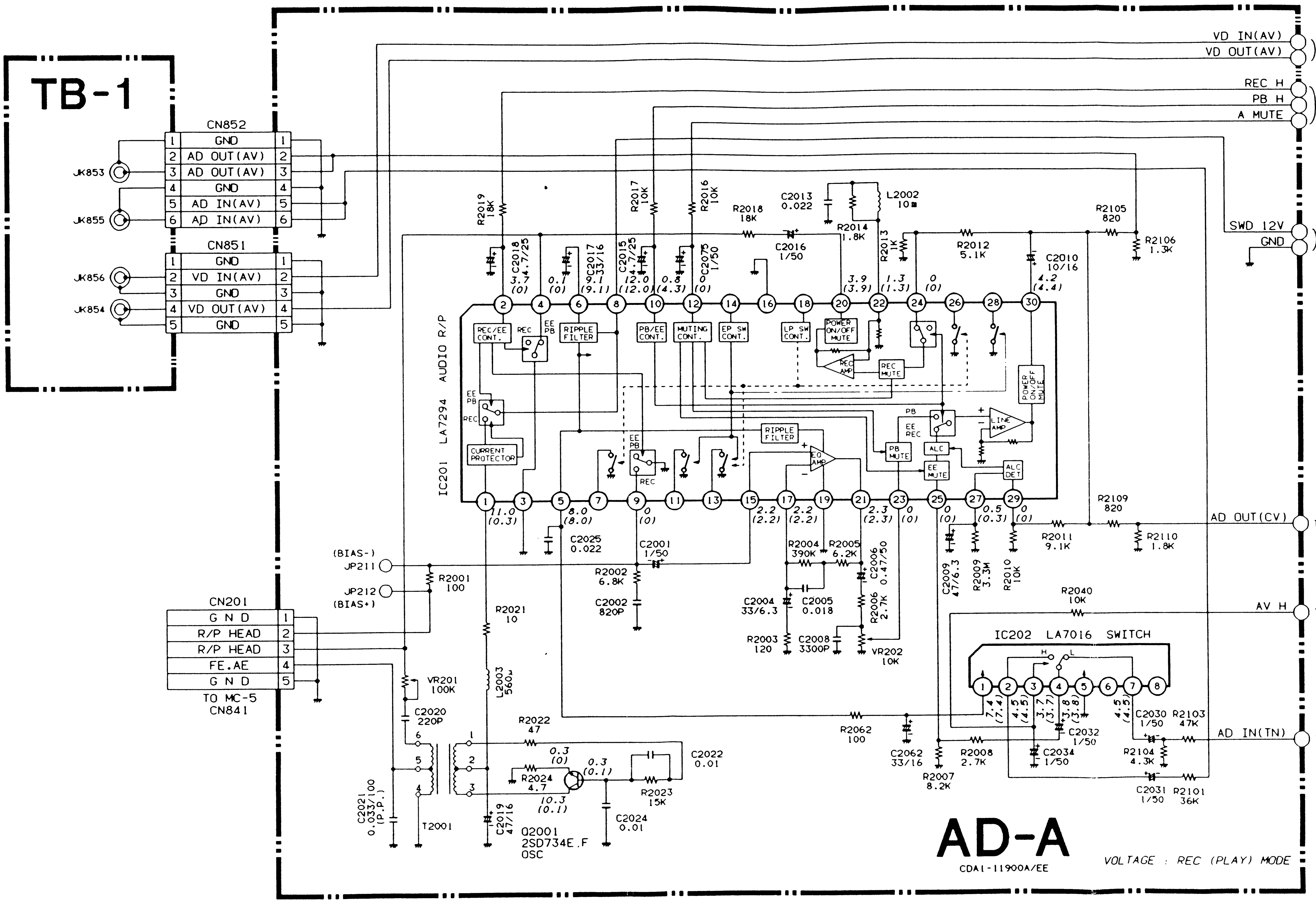
COMPL. CP-1 (CV-A) RF CONVERTER CONNECTION CIRCUIT DIAGRAM


MODULATOR RF
VD IN
AD IN
MOD.(SWD 5V)
GND
BST.(ALWAYS 5V)
TO RF CONVERTER
L6601 15μ
SWD 5V
C6601 100/6.3
ALWAYS 5.8V
C6602 100/6.3
L6602 15μ
D6601 DSK10C
TO VD-A
TO AD-A
TO PW-A
TO PW-A
TO PW-A
CV-A
CDR1-11900/EE

TB-1 TERMINAL P.C.B.

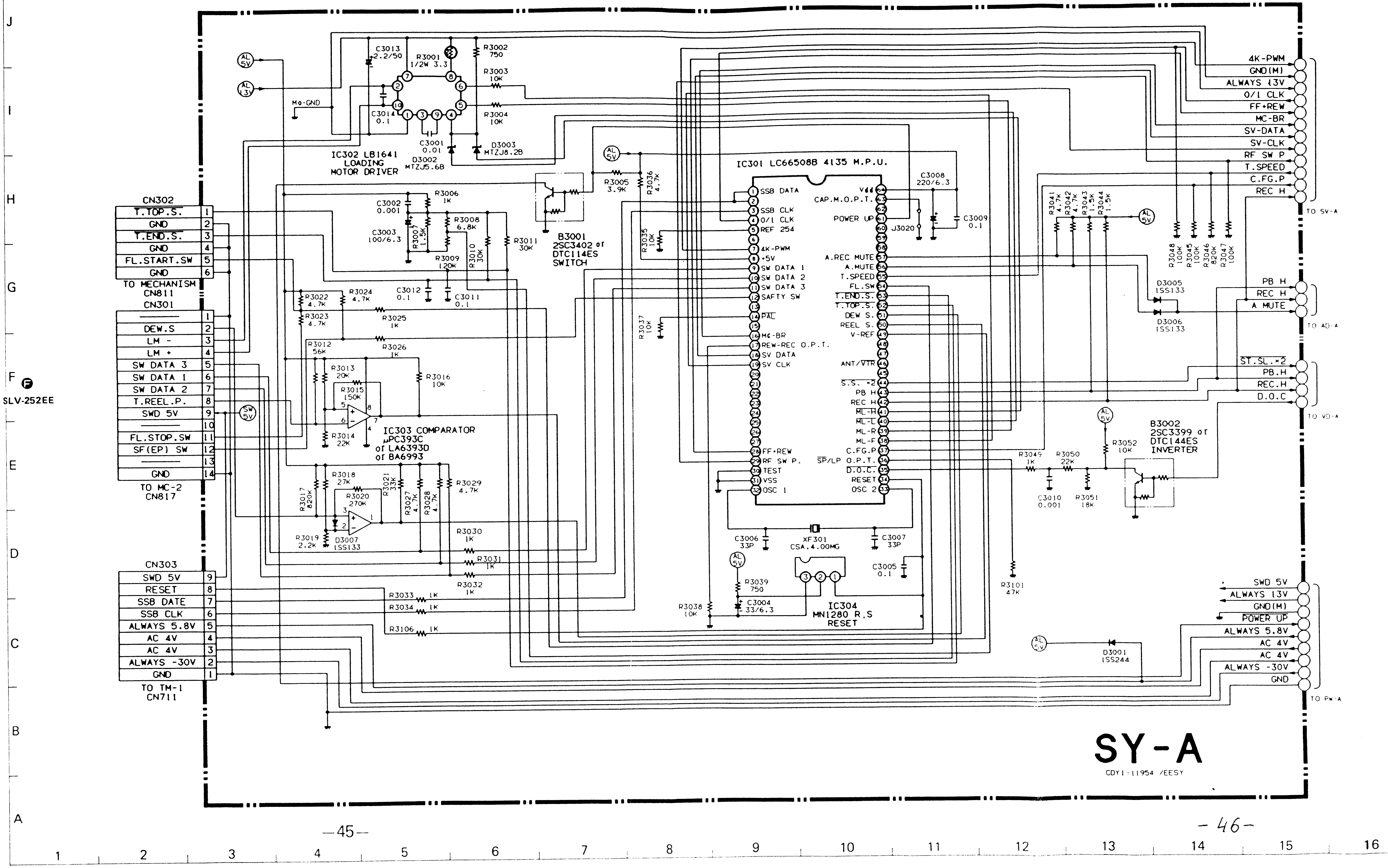

TB-1
1AC4810A21600B
Loc. No. 8501

COMPL. CP-1 (AD-A) AUDIO CIRCUIT DIAGRAM

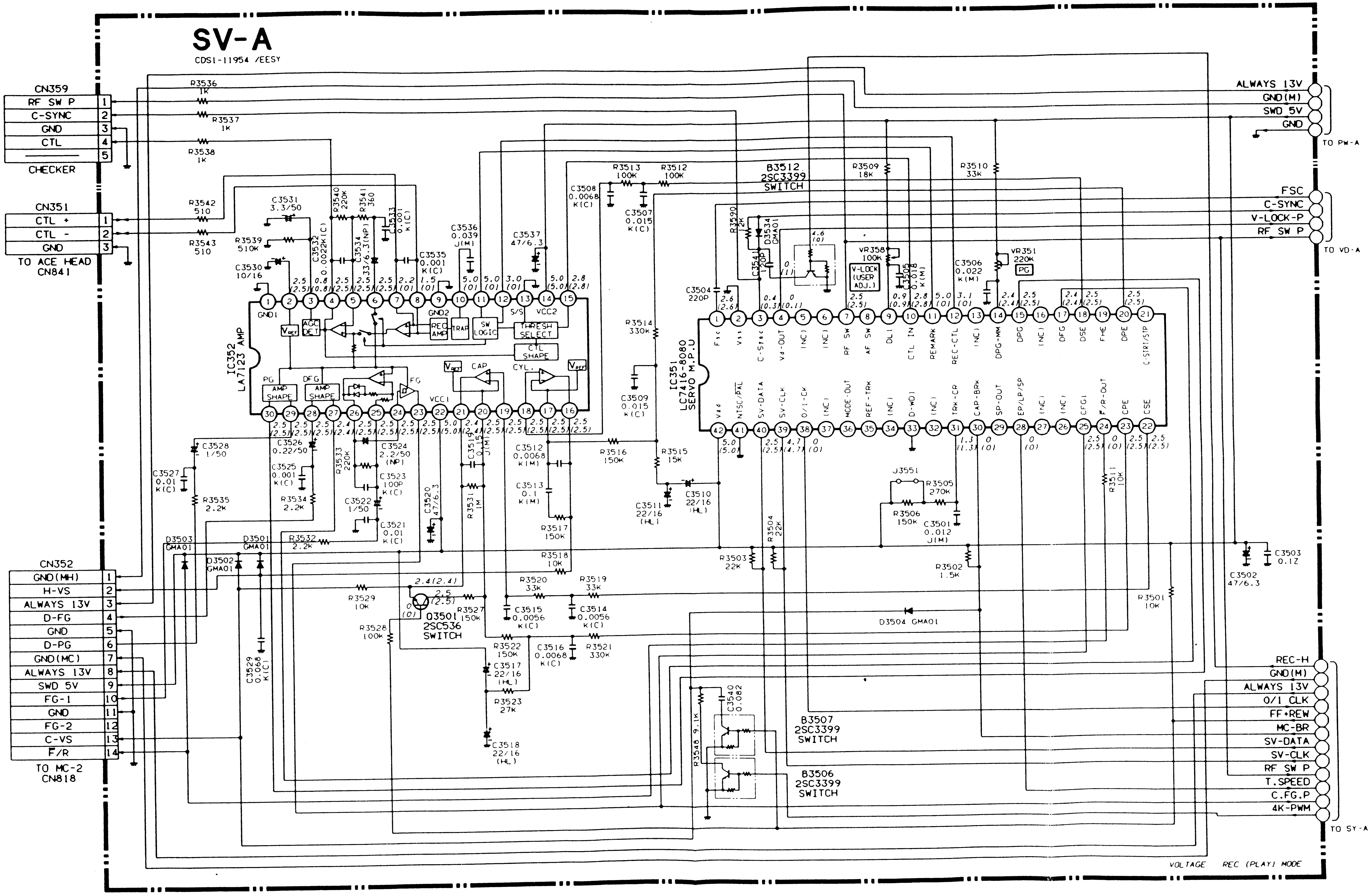

TB-1
CN852
1 GND 1
2 AD OUT(AV) 2
3 AD OUT(AV) 3
4 GND 4
5 AD IN(AV) 5
6 AD IN(AV) 6
JK853
JK855
CN851
1 GND 1
2 VD IN(AV) 2
3 GND 3
4 VD OUT(AV) 4
5 GND 5
JK856
JK854
VD IN(AV)
VD OUT(AV)
TO VD-A
REC H
PB H
A MUTE
TO SY-A
SWD 12V
GND
TO PW-A
AD OUT(CV)
TO CV-A
AV H
TO TM-A
AD IN(TN)
TO TN-A
IC201 LA7294 AUDIO R/P
REC/EE CONT.
RIPPLE FILTER
PB/EE CONT.
MUTING CONT.
EP SW CONT.
LP SW CONT.
POWER ON/OFF MUTE
REC AMP
REC MUTE
CURRENT PROTECTOR
EQ AMP
PB MUTE
EE MUTE
ALC
ALC DET
LINE AMP
IC202 LA7016 SWITCH
R2019 18K
R2017 10K
R2016 10K
R2018 18K
C2013 0.022
L2002 10μ
R2014 1.8K
R2013 1K
R2012 5.1K
R2105 820
R2106 1.3K
C2010 10/16
C2016 1/50
C2018 4.7/25
C2017 33/16
C2015 4.7/25
C2075 1/50
C2025 0.022
C2001 1/50
R2002 6.8K
C2002 820P
R2004 390K
R2005 6.2K
C2006 0.47/50
C2004 33/6.3
C2005 0.018
R2006 2.7K
R2003 120
C2008 3300P
VR202 10K
C2009 47/6.3
R2009 3.3M
R2010 10K
R2011 9.1K
R2109 820
R2110 1.8K
R2040 10K
(BIAS-) JP211
JP212 (BIAS+)
R2001 100
CN201
1 G N D
2 R/P HEAD
3 R/P HEAD
4 FE.AE
5 G N D
TO MC-5 CN841
R2021 10
VR201 100K
C2020 220P
L2003 560μ
R2022 47
R2024 4.7
R2023 15K
C2022 0.01
C2024 0.01
C2021 0.033/100 (P.P.)
T2001
C2019 47/16
Q2001 2SD734E.F OSC
R2062 100
C2062 33/16
R2007 8.2K
R2008 2.7K
C2034 1/50
C2032 1/50
C2030 1/50
R2103 47K
R2104 4.3K
C2031 1/50
R2101 36K
AD-A
CDA1-11900A/EE
VOLTAGE : REC (PLAY) MODE

Ⓔ
SLV-252EE

COMPL. CP-1 (SY-A) SYSTEM CONTROL CIRCUIT DIAGRAM

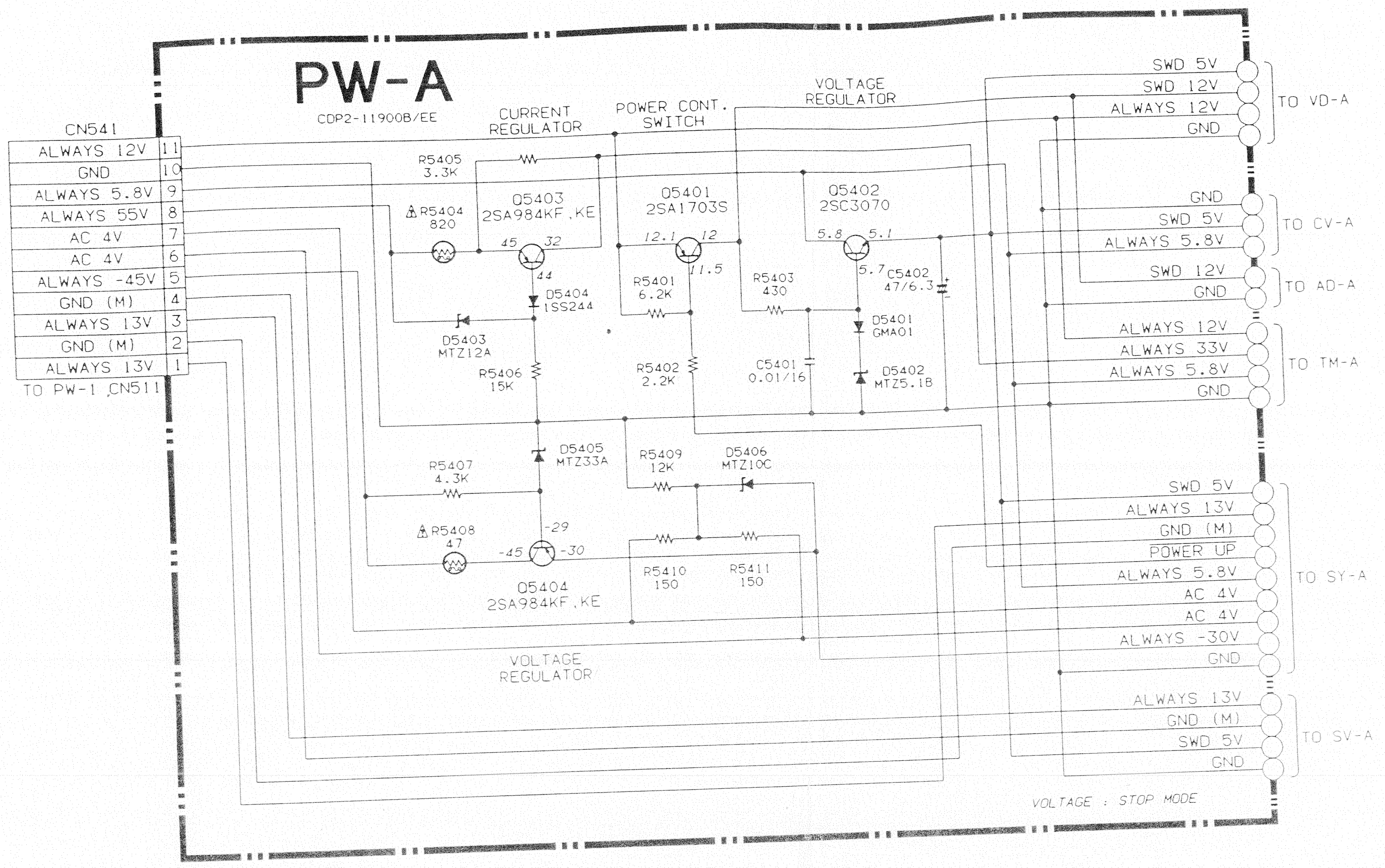

K
J
I
H
G
F
E
D
C
B
A
SLV-252EE
CN302
T.TOP.S.
GND
T.END.S.
GND
FL.START.SW
GND
TO MECHANISM CN811
CN301
DEW.S
LM -
LM +
SW DATA 3
SW DATA 1
SW DATA 2
T.REEL.P.
SWD 5V
FL.STOP.SW
SF(EP) SW
GND
TO MC-2 CN817
CN303
SWD 5V
RESET
SSB DATE
SSB CLK
ALWAYS 5.8V
AC 4V
AC 4V
ALWAYS -30V
GND
TO TM-1 CN711
AL 5V
AL 13V
Mo-GND
C3013 2.2/50
R3001 1/2W 3.3
R3002 750
R3003 10K
R3004 10K
C3014 0.1
C3001 0.01
D3002 MTZJ5.6B
D3003 MTZJ8.2B
IC302 LB1641 LOADING MOTOR DRIVER
C3002 0.001
C3003 100/6.3
R3006 1K
R3007 1.5K
R3008 6.8K
R3009 120K
R3010 30K
R3011 30K
B3001 2SC3402 or DTC114ES SWITCH
R3005 3.9K
R3036 4.7K
R3035 10K
R3037 10K
R3022 4.7K
R3023 4.7K
R3024 4.7K
C3012 0.1
C3011 0.1
R3025 1K
R3012 56K
R3026 1K
R3013 20K
R3015 150K
R3016 10K
R3014 22K
IC303 COMPARATOR μPC393C or LA6393D or BA6993
R3018 27K
R3017 820K
R3020 270K
R3021 33K
R3027 4.7K
R3028 4.7K
R3029 4.7K
R3019 2.2K
D3007 1SS133
R3030 1K
R3031 1K
R3032 1K
R3033 1K
R3034 1K
R3106 1K
SW 5V
IC301 LC66508B 4135 M.P.U.
SSB DATA
SSB CLK
0/1 CLK
REF 254
4K-PWM
+5V
SW DATA 1
SW DATA 2
SW DATA 3
SAFTY SW
PAL
MC-BR
REW-REC O.P.T.
SV DATA
SV CLK
FF+REW
RF SW P.
TEST
VSS
OSC 1
Vdd
CAP.M.O.P.T.
POWER UP
J3020
A.REC MUTE
A.MUTE
T.SPEED
FL.SW
T.END.S.
T.TOP.S.
DEW S.
REEL S.
V-REF
ANT/VTR
S.S. ×2
PB H
REC H
ML-H
ML-L
ML-R
ML-F
C.FG.P
SP/LP O.P.T.
D.O.C.
RESET
OSC 2
C3008 220/6.3
C3009 0.1
C3006 33P
XF301 CSA.4.00MG
C3007 33P
C3005 0.1
R3039 750
C3004 33/6.3
R3038 10K
IC304 MN1280 R.S RESET
R3041 4.7K
R3042 4.7K
R3043 1.5K
R3044 1.5K
R3048 100K
R3045 100K
R3046 820K
R3047 100K
D3005 1SS133
D3006 1SS133
4K-PWM
GND(M)
ALWAYS 13V
0/1 CLK
FF+REW
MC-BR
SV-DATA
SV-CLK
RF SW P
T.SPEED
C.FG.P
REC H
TO SV-A
PB H
REC H
A MUTE
TO AD-A
ST.SL.×2
PB.H
REC.H
D.O.C
TO VD-A
B3002 2SC3399 or DTC144ES INVERTER
R3052 10K
R3049 1K
R3050 22K
C3010 0.001
R3051 18K
R3101 47K
D3001 1SS244
SWD 5V
ALWAYS 13V
GND(M)
POWER UP
ALWAYS 5.8V
AC 4V
AC 4V
ALWAYS -30V
GND
TO PW-A
SY-A
CDY1-11954 /EESY
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

COMPL. CP-1 (SV-A) SERVO CIRCUIT DIAGRAM

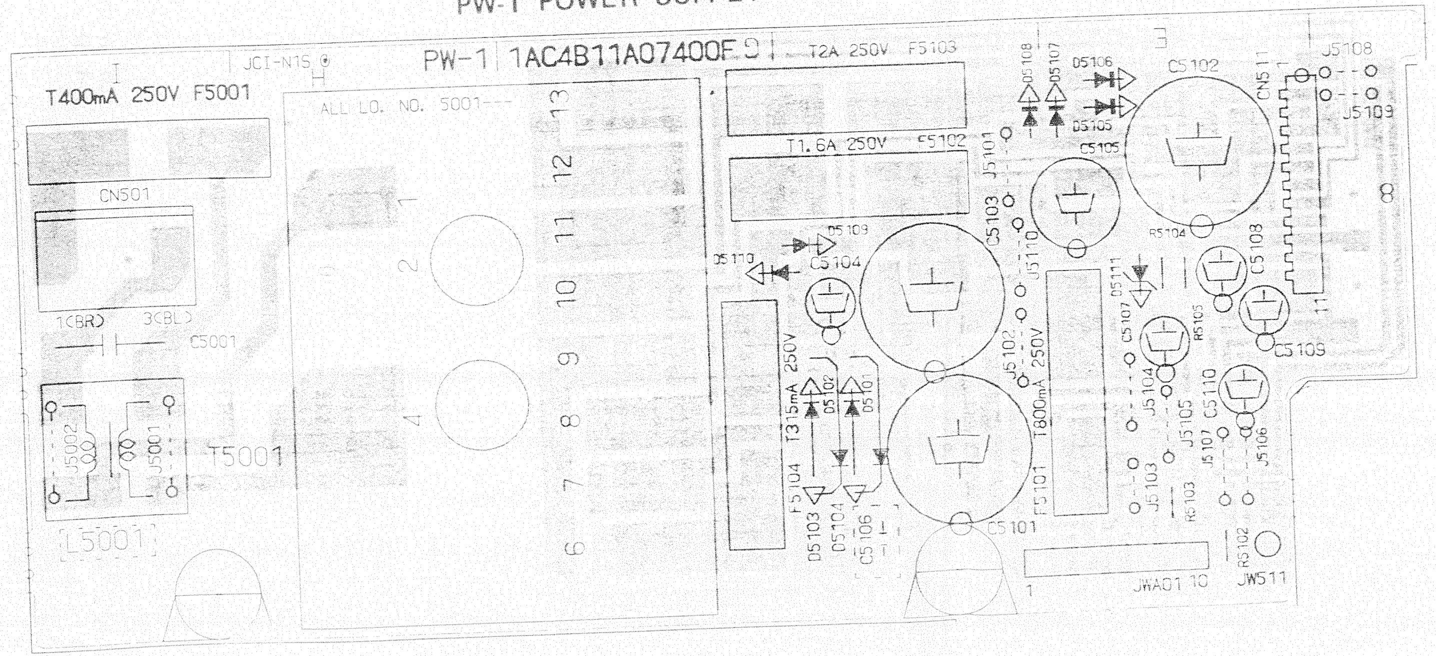

SV-A
CDS1-11954 /EESY
CN359
RF SW P
C-SYNC
GND
CTL
CHECKER
CN351
CTL +
CTL -
GND
TO ACE HEAD CN841
CN352
GND(MH)
H-VS
ALWAYS 13V
D-FG
GND
D-PG
GND(MC)
ALWAYS 13V
SWD 5V
FG-1
GND
FG-2
C-VS
F/R
TO MC-2 CN818
IC352 LA7123 AMP
IC351 LC7416-8080 SERVO M.P.U
Q3501 2SC536 SWITCH
B3512 2SC3399 SWITCH
B3507 2SC3399 SWITCH
B3506 2SC3399 SWITCH
VR358 100K V-LOCK (USER ADJ.)
VR351 220K PG
D3504 GMA01
J3551
ALWAYS 13V
GND(M)
SWD 5V
GND
TO PW-A
FSC
C-SYNC
V-LOCK-P
RF SW P
TO VD-A
REC-H
GND(M)
ALWAYS 13V
0/1 CLK
FF+REW
MC-BR
SV-DATA
SV-CLK
RF SW P
T.SPEED
C.FG.P
4K-PWM
TO SY-A
VOLTAGE REC (PLAY) MODE

16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

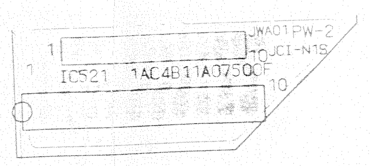
COMPL. CP-1 (PW-A) POWER SUPPLY CIRCUIT DIAGRAM


PW-A
CDP2-119008/EE
CN541
ALWAYS 12V 11
GND 10
ALWAYS 5.8V 9
ALWAYS 55V 8
AC 4V 7
AC 4V 6
ALWAYS -45V 5
GND (M) 4
ALWAYS 13V 3
GND (M) 2
ALWAYS 13V 1
TO PW-1 CN511
CURRENT REGULATOR
POWER CONT. SWITCH
VOLTAGE REGULATOR
R5405 3.3K
R5404 820
Q5403 2SA984KF.KE
Q5401 2SA1703S
Q5402 2SC3070
D5404 1SS244
D5403 MTZ12A
R5406 15K
R5401 6.2K
R5402 2.2K
R5403 430
C5401 0.01/16
C5402 47/6.3
D5401 GMA01
D5402 MTZ5.1B
D5405 MTZ33A
R5407 4.3K
R5408 47
R5409 12K
D5406 MTZ10C
Q5404 2SA984KF.KE
R5410 150
R5411 150
VOLTAGE REGULATOR
SWD 5V
SWD 12V
ALWAYS 12V
GND
TO VD-A
GND
SWD 5V
ALWAYS 5.8V
TO CV-A
SWD 12V
GND
TO AD-A
ALWAYS 12V
ALWAYS 33V
ALWAYS 5.8V
GND
TO TM-A
SWD 5V
ALWAYS 13V
GND (M)
POWER UP
ALWAYS 5.8V
AC 4V
AC 4V
ALWAYS -30V
GND
TO SY-A
ALWAYS 13V
GND (M)
SWD 5V
GND
TO SV-A
VOLTAGE : STOP MODE

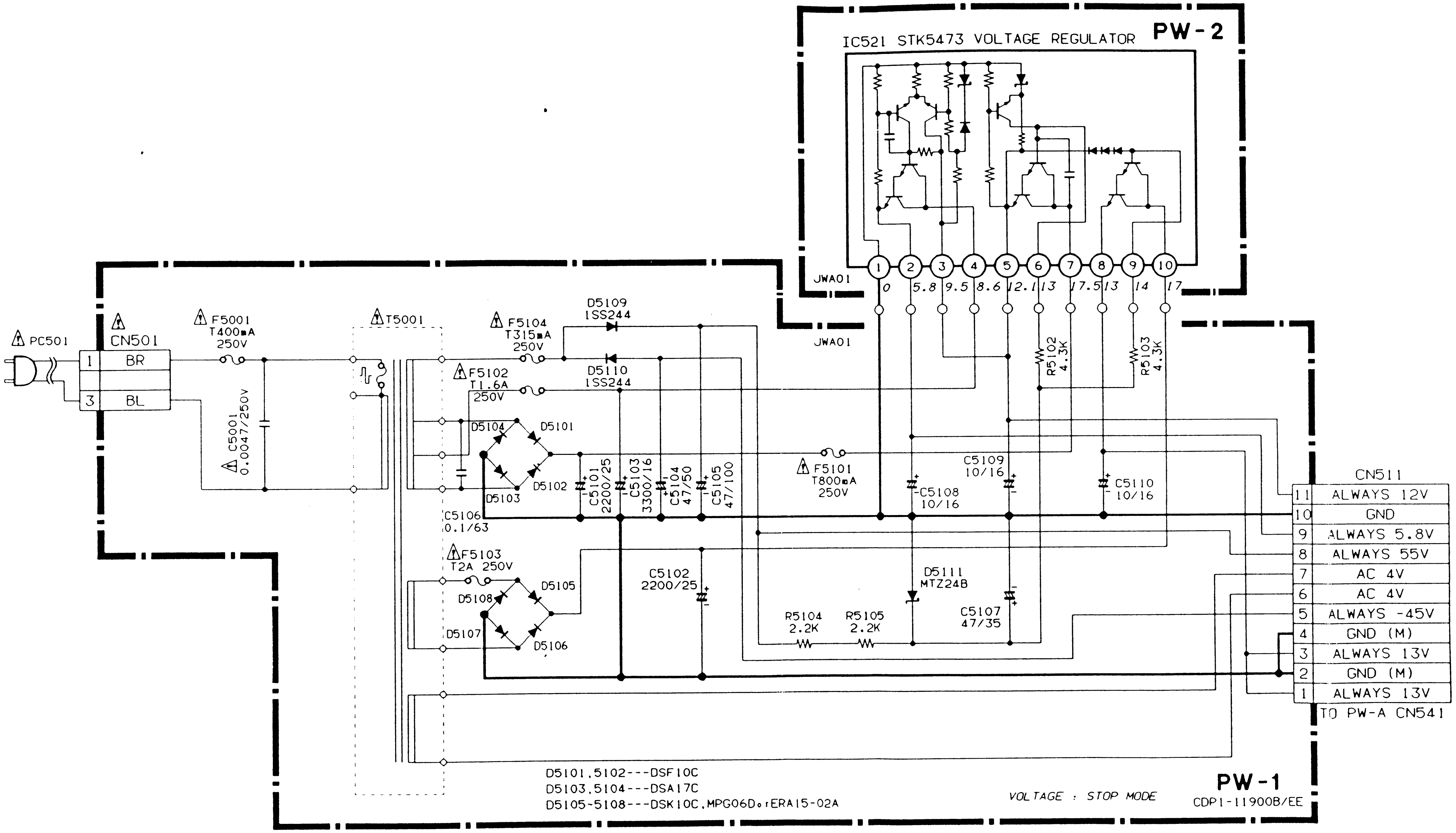
PW-1 POWER SUPPLY P.C.B.


PW-1 1AC4B11A07400F
JCI-N15
T400mA 250V F5001
ALL LO. NO. 5001---
T2A 250V F5103
T1.6A 250V F5102
CN501
C5001
T5001
L5001
C5102
C5101
C5104
C5105
CN511
J5108
J5109
JWA01
JW511

PW-2 POWER SUPPLY P.C.B.

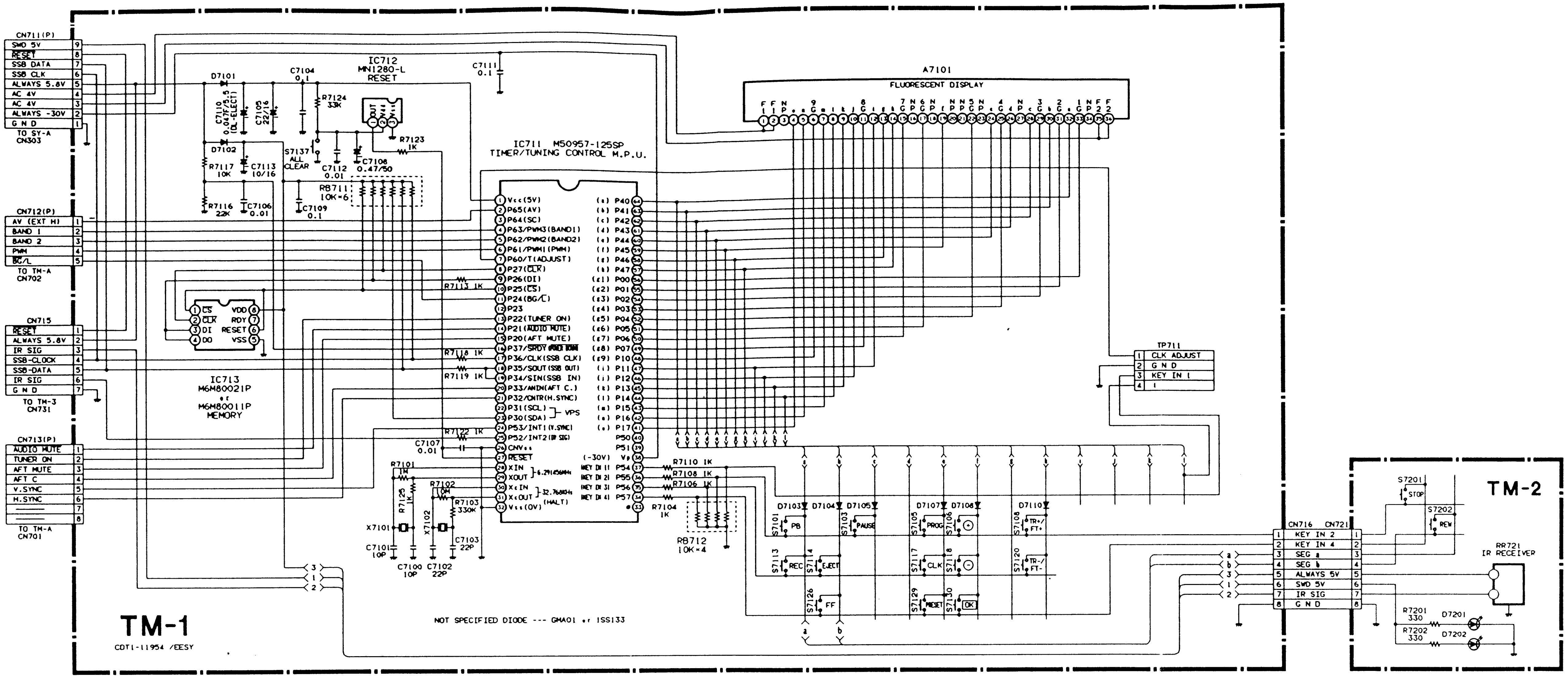

JWA01 PW-2
JCI-N15
IC521 1AC4B11A0750
1
10

COMPL. PW-1 & COMPL. PW-2 POWER SUPPLY CIRCUIT DIAGRAM


IC521 STK5473 VOLTAGE REGULATOR
PW-2
JWA01
1 2 3 4 5 6 7 8 9 10
0 5.8 9.5 8.6 12.1 13 17.5 13 14 17
⚠ PC501
⚠ CN501
1 BR
3 BL
⚠ F5001 T400mA 250V
⚠ C5001 0.0047/250V
⚠ T5001
⚠ F5104 T315mA 250V
D5109 1SS244
D5110 1SS244
⚠ F5102 T1.6A 250V
D5104
D5101
D5102
D5103
C5101 2200/25
C5103 3300/16
C5104 47/50
C5105 47/100
C5106 0.1/63
⚠ F5101 T800mA 250V
C5108 10/16
C5109 10/16
C5110 10/16
R5102 4.3K
R5103 4.3K
⚠ F5103 T2A 250V
D5108
D5105
D5107
D5106
C5102 2200/25
D5111 MTZ24B
C5107 47/35
R5104 2.2K
R5105 2.2K
CN511
11 ALWAYS 12V
10 GND
9 ALWAYS 5.8V
8 ALWAYS 55V
7 AC 4V
6 AC 4V
5 ALWAYS -45V
4 GND (M)
3 ALWAYS 13V
2 GND (M)
1 ALWAYS 13V
TO PW-A CN541
D5101,5102---DSF10C
D5103,5104---DSA17C
D5105-5108---DSK10C,MPG06D or ERA15-02A
VOLTAGE : STOP MODE
PW-1
CDP1-11900B/EE

SLV-252EE

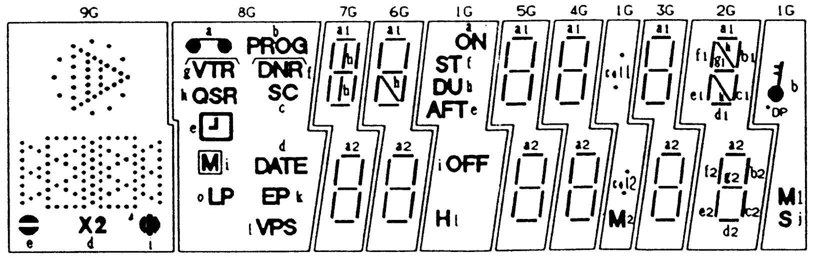
COMPL. TM-1 DISPLAY, TIMER, TUNING CONTROL & COMPL. TM-2 SWITCH CIRCUIT DIAGRAM


CN711(P)
SWD 5V
RESET
SSB DATA
SSB CLK
ALWAYS 5.8V
AC 4V
AC 4V
ALWAYS -30V
G N D
TO SY-A CN303
CN712(P)
AV (EXT H)
BAND 1
BAND 2
PWM
BG/L
TO TM-A CN702
CN715
RESET
ALWAYS 5.8V
IR SIG
SSB-CLOCK
SSB-DATA
IR SIG
G N D
TO TM-3 CN731
CN713(P)
AUDIO MUTE
TUNER ON
AFT MUTE
AFT C
V.SYNC
H.SYNC
TO TM-A CN701
D7101
D7102
C7110 0.047F/5.5 (DL-ELECT)
C7105 22/16
C7104 0.1
R7124 33K
IC712 MN1280-L RESET
OUT
Vdd
Vss
R7123 1K
C7111 0.1
S7137 ALL CLEAR
C7112 0.01
C7108 0.47/50
R7117 10K
C7113 10/16
R7116 22K
C7106 0.01
C7109 0.1
RB711 10K×6
R7113 1K
CS
CLK
DI
DO
VDD
RDY
RESET
VSS
IC713 M6M80021P or M6M80011P MEMORY
R7118 1K
R7119 1K
R7122 1K
C7107 0.01
R7101 1M
R7125 1K
R7102 10M
R7103 330K
X7101
X7102
C7101 10P
C7100 10P
C7102 22P
C7103 22P
IC711 M50957-125SP TIMER/TUNING CONTROL M.P.U.
Vcc(5V)
P65(AV)
P64(SC)
P63/PWM3(BAND1)
P62/PWM2(BAND2)
P61/PWM1(PWM)
P60/T(ADJUST)
P27(CLK)
P26(DI)
P25(CS)
P24(BG/L)
P23
P22(TUNER ON)
P21(AUDIO MUTE)
P20(AFT MUTE)
P37/SRDY
P36/CLK(SSB CLK)
P35/SOUT(SSB OUT)
P34/SIN(SSB IN)
P33/ANIN(AFT C.)
P32/CNTR(H.SYNC)
P31(SCL)
P30(SDA)
VPS
P53/INT1(V.SYNC)
P52/INT2(IR SIG)
CNVss
RESET
XIN
XOUT
6.291456MHz
XcIN
XcOUT
32.768KHz
(HALT)
Vss(0V)
P40
P41
P42
P43
P44
P45
P46
P47
P00
P01
P02
P03
P04
P05
P06
P07
P10
P11
P12
P13
P14
P15
P16
P17
P50
P51
(-30V) Vp
KEY IN 1 P54
KEY IN 2 P55
KEY IN 3 P56
KEY IN 4 P57
R7110 1K
R7108 1K
R7106 1K
R7104 1K
RB712 10K×4
A7101 FLUORESCENT DISPLAY
TP711
CLK ADJUST
G N D
KEY IN 1
1
D7103
D7104
D7105
D7107
D7108
D7110
S7101 PB
S7103 PAUSE
S7105 PROG
S7106 +
S7108 TR+/FT+
S7113 REC
S7114 EJECT
S7117 CLK
S7118 -
S7120 TR-/FT-
S7126 FF
S7129 PRESET
S7130 OK
TM-1
CDT1-11954 /EESY
NOT SPECIFIED DIODE --- GMA01 or 1SS133
CN716
CN721
KEY IN 2
KEY IN 4
SEG a
SEG b
ALWAYS 5V
SWD 5V
IR SIG
G N D
TM-2
S7201 STOP
S7202 REW
RR721 IR RECEIVER
R7201 330
R7202 330
D7201
D7202

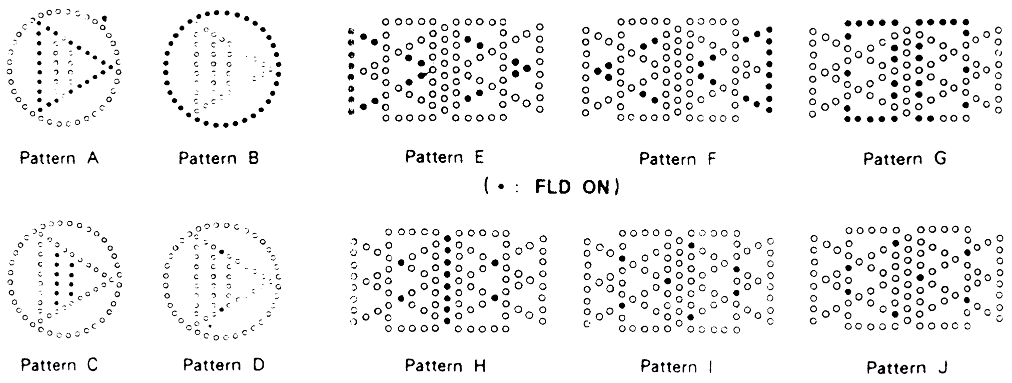
ANODE CONNECTION

	9G	8G	7G	6G	5G	4G	3G	2G	1G
a	B	●●	a1	a1	a1	a1	a1	a1	ON
b	A	PROG.	b1	b1	b1	b1	b1	b1	●
c	-	SC	c1	c1	c1	c1	c1	c1	DP
d	×2	DATE	d1	d1	d1	d1	d1	d1	M(1)
e	⊖	J	e1	e1	e1	e1	e1	e1	AFT
f	C	DNR	f1	f1	f1	f1	f1	f1	ST
g	D	VTR	g1	g1	g1	g1	g1	g1	col'1
h	-	QSR	/	\	-	-	-	\	DU
i	●	M	a2	a2	a2	a2	a2	a2	OFF
j	E	-	b2	b2	b2	b2	b2	b2	S
k	I	EP	c2	c2	c2	c2	c2	c2	-
l	H	VPS	d2	d2	d2	d2	d2	d2	H
m	J	-	e2	e2	e2	e2	e2	e2	M(2)
n	F	-	f2	f2	f2	f2	f2	f2	-
o	G	LP	g2	g2	g2	g2	g2	g2	col'2

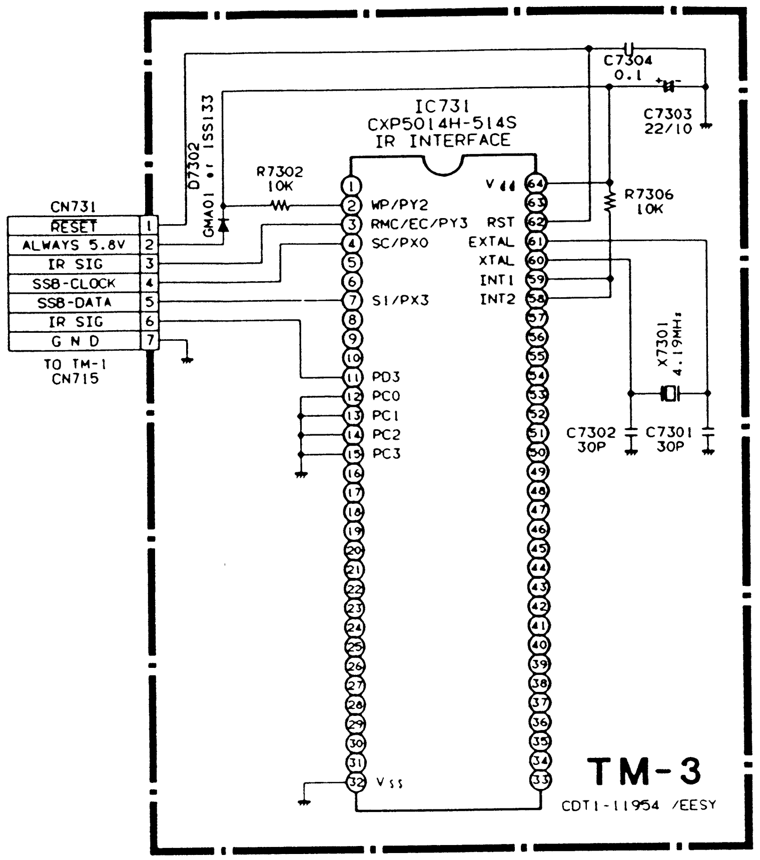
GRID ASSIGNMENT


9G
8G
7G
6G
1G
5G
4G
1G
3G
2G
1G
PROG
VTR
DNR
QSR
SC
DATE
EP
LP
VPS
X2
ON
ST
DU
AFT
OFF
H
M
M
S
DP
a1
b1
c1
d1
e1
f1
g1
a2
b2
c2
d2
e2
f2
g2

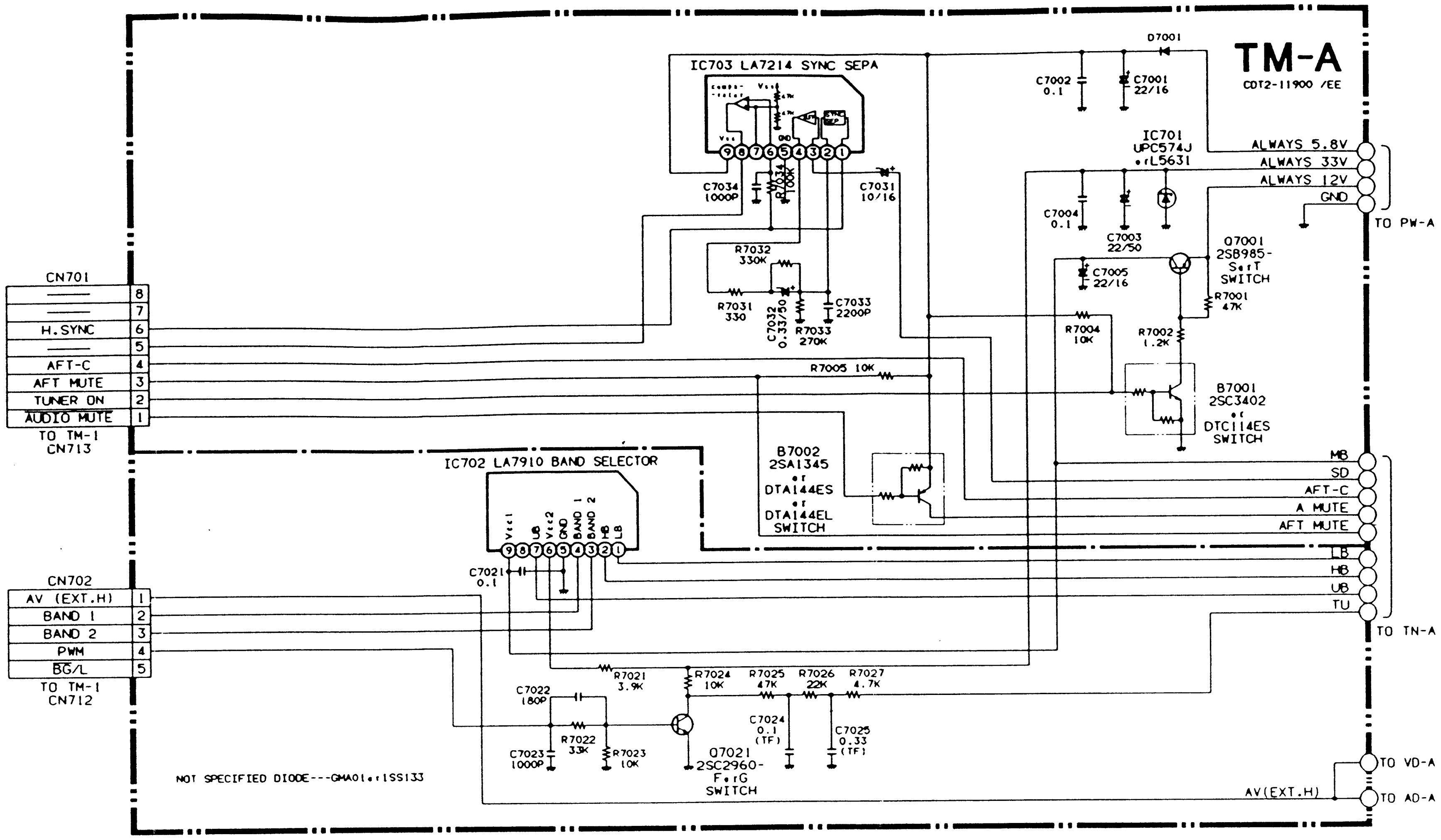
9G: GRAPHIC MODE DISPLAY


Pattern A
Pattern B
Pattern E
Pattern F
Pattern G
(• : FLD ON)
Pattern C
Pattern D
Pattern H
Pattern I
Pattern J

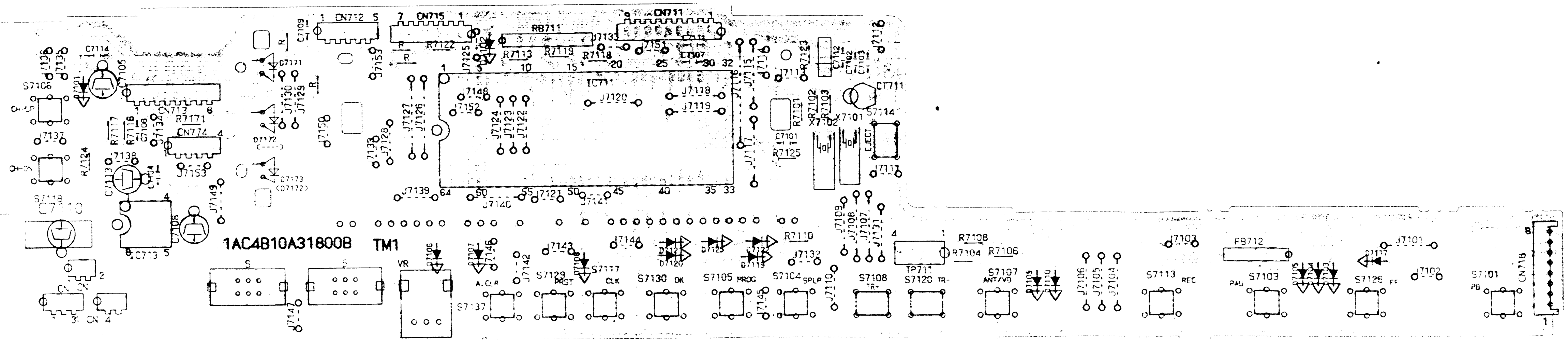
COMPL. TM-3 IR INTERFACE CIRCUIT DIAGRAM


IC731
CXP5014H-514S
IR INTERFACE
CN731
RESET
ALWAYS 5.8V
IR SIG
SSB-CLOCK
SSB-DATA
IR SIG
GND
TO TM-1
CN715
D7302
GMA01 or 1SS133
R7302
10K
WP/PY2
RMC/EC/PY3
SC/PXO
S1/PX3
PD3
PC0
PC1
PC2
PC3
Vss
Vdd
RST
EXTAL
XTAL
INT1
INT2
C7304
0.1
C7303
22/10
R7306
10K
X7301
4.19MHz
C7302
30P
C7301
30P
TM-3
CDT1-11954 /EESY

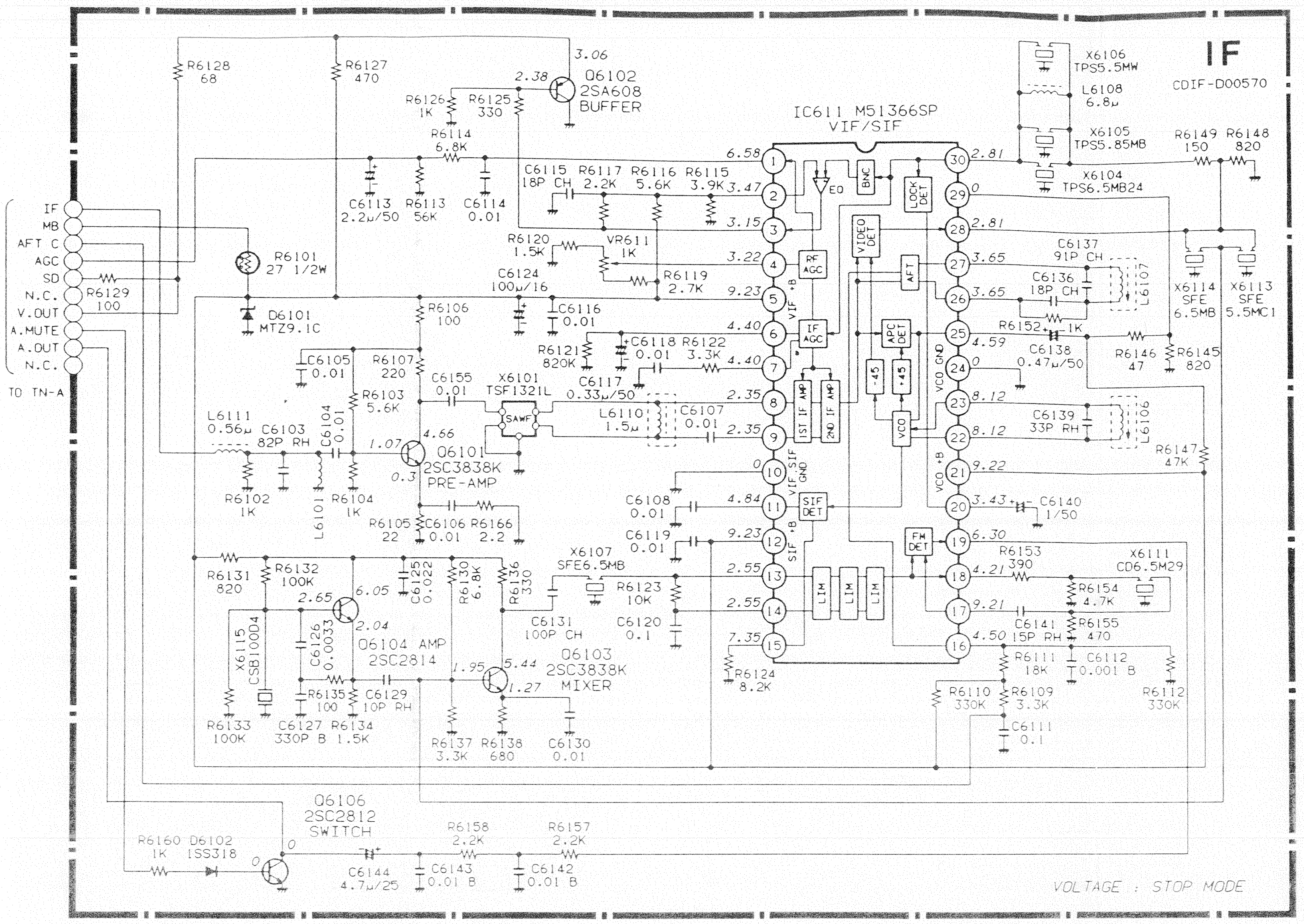
COMPL. CP-1 (TM-A) SYNC. SEPARATION & TUNING SELECT CIRCUIT DIAGRAM


TM-A
CDT2-11900 /EE
IC703 LA7214 SYNC SEPA
D7001
C7002
0.1
C7001
22/16
IC701
UPC574J
or L5631
ALWAYS 5.8V
ALWAYS 33V
ALWAYS 12V
GND
TO PW-A
C7034
1000P
R7034
100K
C7031
10/16
C7004
0.1
C7003
22/50
Q7001
2SB985-
S or T
SWITCH
C7005
22/16
R7001
47K
R7032
330K
R7031
330
C7032
0.33/50
R7033
270K
C7033
2200P
R7004
10K
R7002
1.2K
CN701
H.SYNC
AFT-C
AFT MUTE
TUNER ON
AUDIO MUTE
TO TM-1
CN713
R7005 10K
B7001
2SC3402
or
DTC114ES
SWITCH
B7002
2SA1345
or
DTA144ES
or
DTA144EL
SWITCH
IC702 LA7910 BAND SELECTOR
Vcc1
UB
Vcc2
GND
BAND 1
BAND 2
HB
LB
MB
SD
AFT-C
A MUTE
AFT MUTE
LB
HB
UB
TU
TO TN-A
C7021
0.1
CN702
AV (EXT.H)
BAND 1
BAND 2
PWM
BG/L
TO TM-1
CN712
R7021
3.9K
R7024
10K
R7025
47K
R7026
22K
R7027
4.7K
C7022
180P
C7024
0.1
(TF)
C7025
0.33
(TF)
C7023
1000P
R7022
33K
R7023
10K
Q7021
2SC2960-
F or G
SWITCH
TO VD-A
AV(EXT.H)
TO AD-A
NOT SPECIFIED DIODE---GMA01 or 1SS133

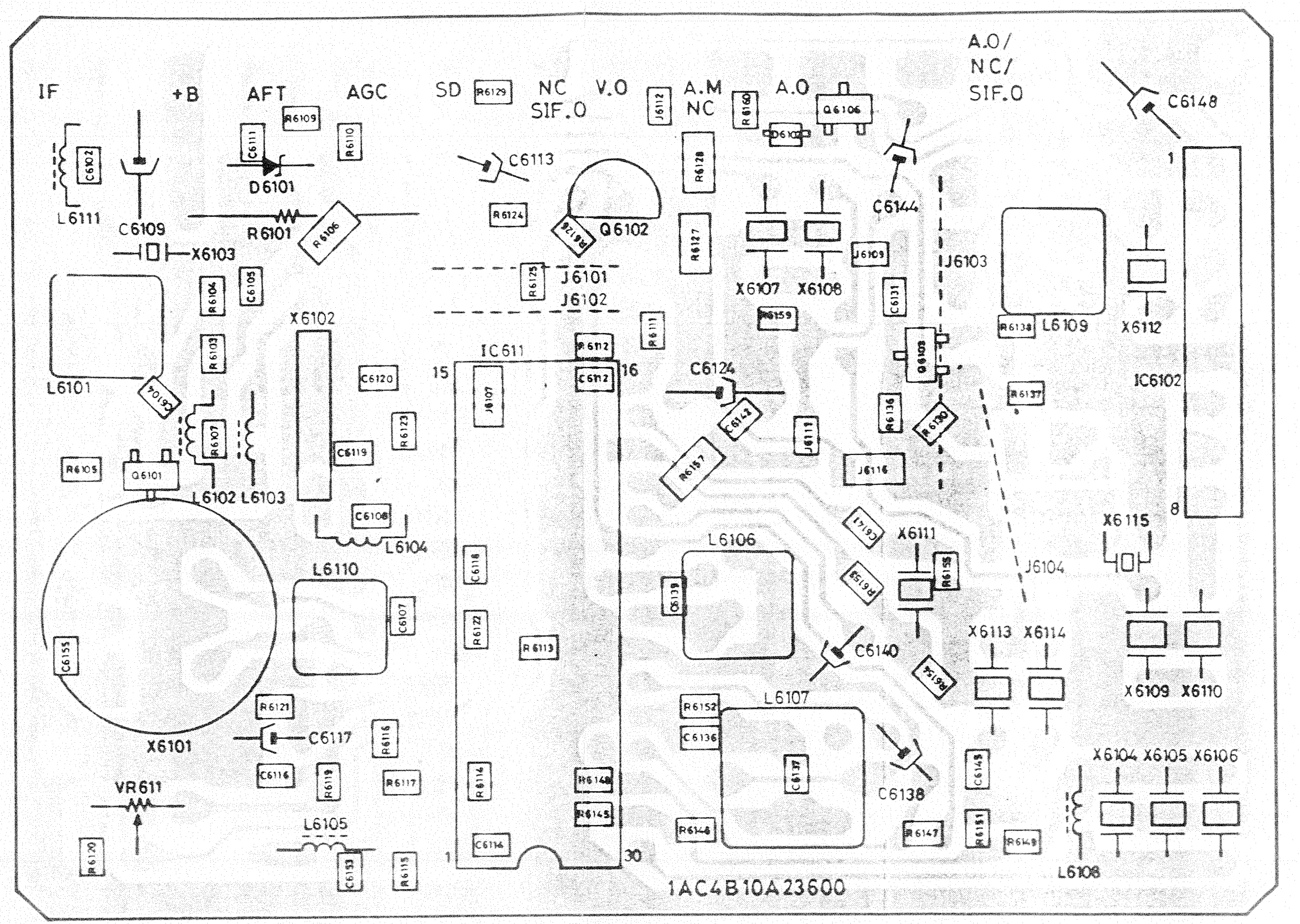
TM-1 DISPLAY, TIMER & TUNING CONTROL P.C.B.


1AC4B10A31800B TM1
CN712
CN715
CN711
CN714
CN716
IC711
RB711
RB712
X7101
S7101
S7103
S7104
S7105
S7106
S7107
S7108
S7113
S7114
S7117
S7120
S7125
S7129
S7130
S7137
A.CLR
PRST
CLK
OK
PROG
SPLP
TR+
TR-
ANT/VD
REC
PAU
FF
PB
TP711
VR

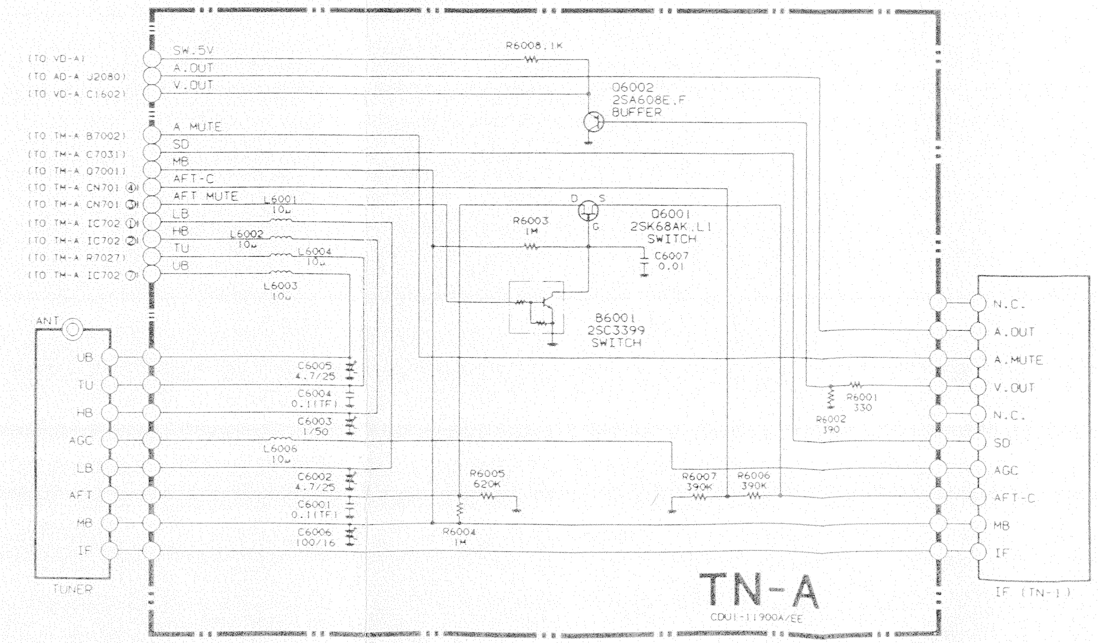
IF CIRCUIT DIAGRAM


IF
CDIF-D00570
IC611 M51366SP VIF/SIF
Q6102 2SA608 BUFFER
Q6101 2SC3838K PRE-AMP
Q6104 AMP 2SC2814
Q6103 2SC3838K MIXER
Q6106 2SC2812 SWITCH
X6101 TSF1321L
X6107 SFE6.5MB
X6111 CD6.5M29
X6104 TPS6.5MB24
X6105 TPS5.85MB
X6106 TPS5.5MW
X6114 SFE 6.5MB
X6113 SFE 5.5MC1
D6101 MTZ9.1C
IF
MB
AFT C
AGC
SD
N.C.
V.OUT
A.MUTE
A.OUT
N.C.
TO TN-A
VOLTAGE : STOP MODE

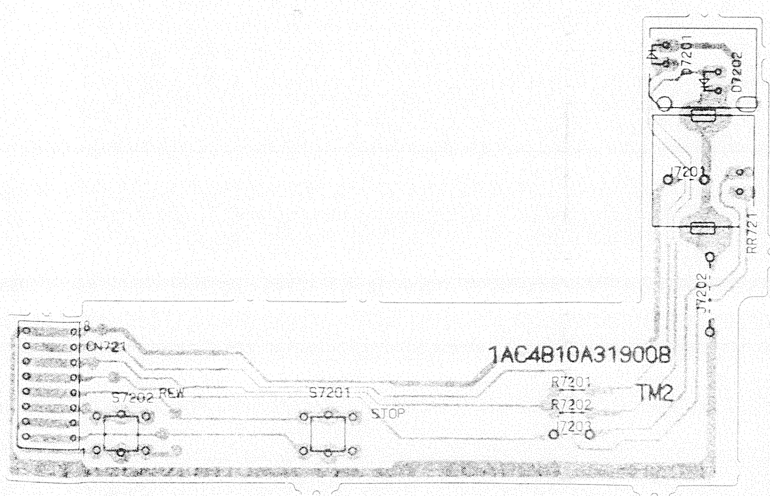
IF P.C.B.


IF
+B
AFT
AGC
SD
NC SIF.O
V.O
A.M NC
A.O
A.O/ NC/ SIF.O
IC611
IC6102
1AC4B10A23600

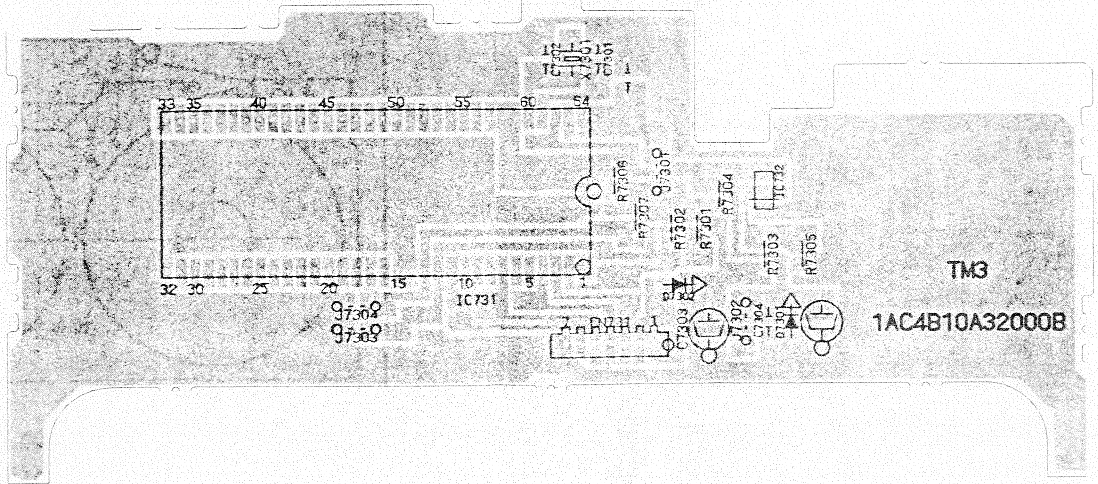
COMPL. CP-1 (TN-A) TUNER IF CONNECTION CIRCUIT DIAGRAM


Q6002 2SA608E,F BUFFER
Q6001 2SK68AK,L1 SWITCH
B6001 2SC3399 SWITCH
TUNER
IF (TN-1)
TN-A
CDU1-11900A/EE

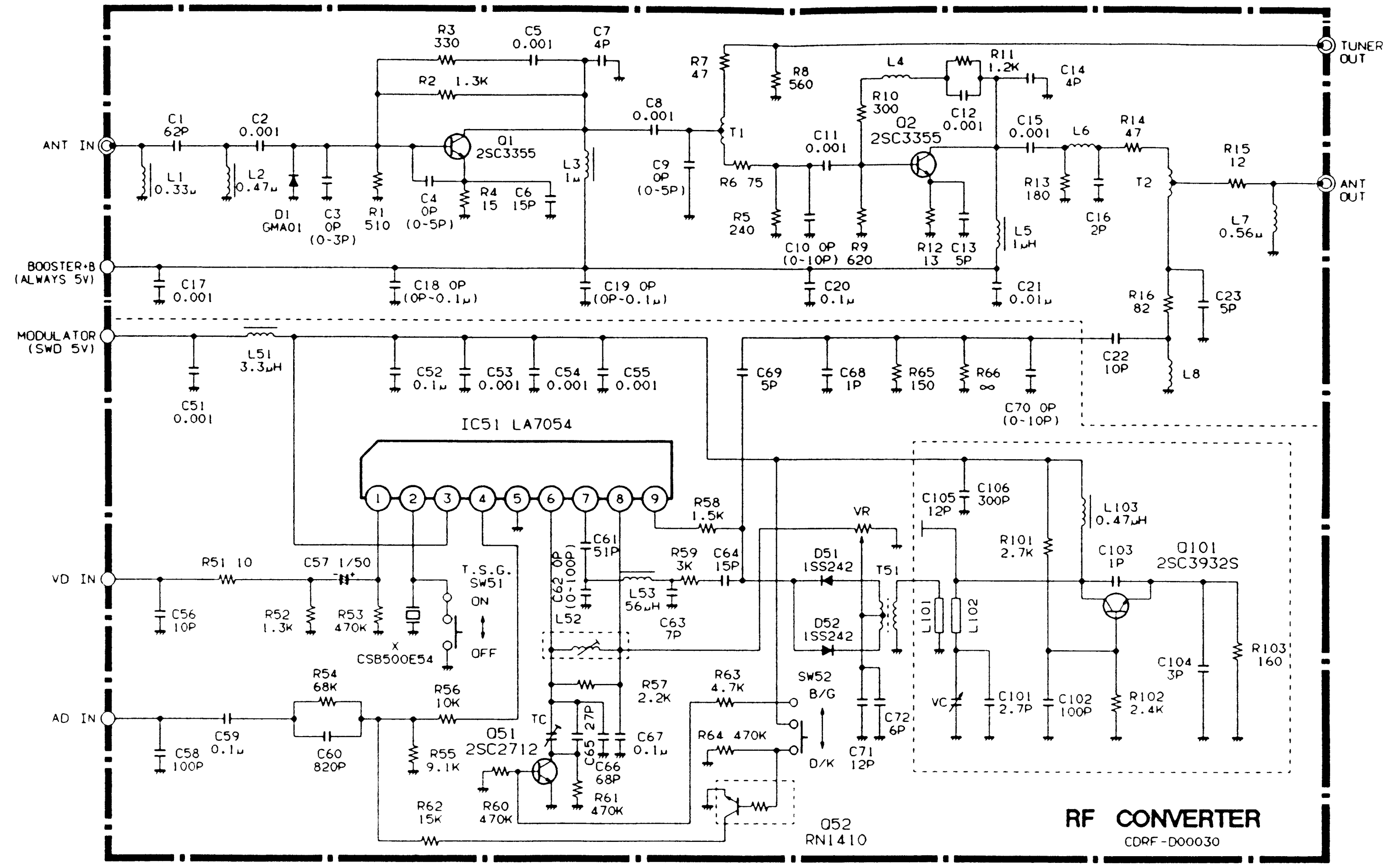
TM-2 SWITCH P.C.B.


1AC4B10A31900B
TM2
S7201 STOP
S7202 REW

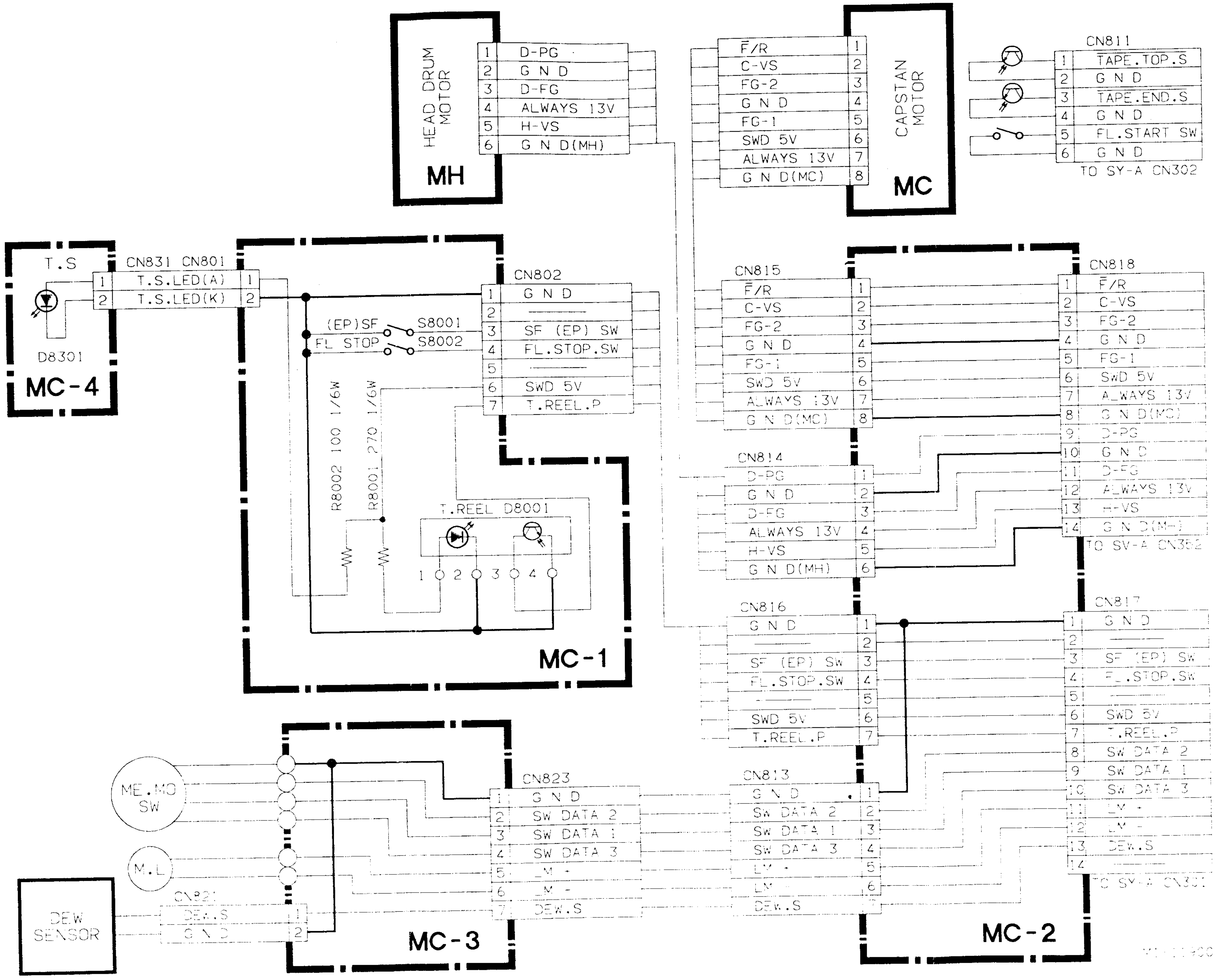
TM-3 IR INTERFACE P.C.B.


IC731
TM3
1AC4B10A32000B

RF CONVERTER CIRCUIT DIAGRAM


ANT IN
BOOSTER+B (ALWAYS 5V)
MODULATOR (SWD 5V)
VD IN
AD IN
TUNER OUT
ANT OUT
C1 62P
C2 0.001
L1 0.33μ
L2 0.47μ
D1 GMA01
C3 0P (0-3P)
R1 510
R3 330
C5 0.001
C7 4P
R2 1.3K
Q1 2SC3355
C4 0P (0-5P)
R4 15
C6 15P
L3 1μ
C8 0.001
C9 0P (0-5P)
R7 47
R8 560
T1
R6 75
R5 240
C11 0.001
C10 0P (0-10P)
R9 620
L4
R10 300
Q2 2SC3355
R11 1.2K
C12 0.001
C14 4P
R12 13
C13 5P
L5 1μH
C15 0.001
L6
R14 47
R13 180
C16 2P
T2
R15 12
L7 0.56μ
R16 82
C23 5P
L8
C22 10P
C17 0.001
C18 0P (0P-0.1μ)
C19 0P (0P-0.1μ)
C20 0.1μ
C21 0.01μ
L51 3.3μH
C51 0.001
C52 0.1μ
C53 0.001
C54 0.001
C55 0.001
C69 5P
C68 1P
R65 150
R66 ∞
C70 0P (0-10P)
IC51 LA7054
1 2 3 4 5 6 7 8 9
R58 1.5K
C61 51P
C62 0P (0-100P)
R59 3K
C64 15P
L53 56μH
C63 7P
L52
VR
D51 1SS242
D52 1SS242
T51
C105 12P
C106 300P
R101 2.7K
L103 0.47μH
C103 1P
Q101 2SC3932S
L101
L102
VC
C101 2.7P
C102 100P
R102 2.4K
C104 3P
R103 160
R51 10
C57 1/50
C56 10P
R52 1.3K
R53 470K
X CSB500E54
T.S.G. SW51
ON
OFF
R54 68K
C59 0.1μ
C60 820P
R56 10K
R55 9.1K
C58 100P
R57 2.2K
TC
Q51 2SC2712
C65 27P
C66 68P
C67 0.1μ
R61 470K
R60 470K
R62 15K
R63 4.7K
SW52
B/G
D/K
R64 470K
C71 12P
C72 6P
Q52 RN1410
RF CONVERTER
CDRF-D00030

MECHANISM CONNECTION CIRCUIT DIAGRAM


HEAD DRUM MOTOR
MH
1 D-PG
2 G N D
3 D-FG
4 ALWAYS 13V
5 H-VS
6 G N D(MH)
CAPSTAN MOTOR
MC
1 F/R
2 C-VS
3 FG-2
4 G N D
5 FG-1
6 SWD 5V
7 ALWAYS 13V
8 G N D(MC)
CN811
1 TAPE.TOP.S
2 G N D
3 TAPE.END.S
4 G N D
5 FL.START SW
6 G N D
TO SY-A CN302
T.S
D8301
MC-4
CN831 CN801
1 T.S.LED(A) 1
2 T.S.LED(K) 2
CN802
1 G N D
2
3 SF (EP) SW
4 FL.STOP.SW
5
6 SWD 5V
7 T.REEL.P
(EP)SF
FL STOP
S8001
S8002
R8002 100 1/6W
R8001 270 1/6W
T.REEL D8001
1 2 3 4
MC-1
CN815
1 F/R
2 C-VS
3 FG-2
4 G N D
5 FG-1
6 SWD 5V
7 ALWAYS 13V
8 G N D(MC)
CN814
1 D-PG
2 G N D
3 D-FG
4 ALWAYS 13V
5 H-VS
6 G N D(MH)
CN818
1 F/R
2 C-VS
3 FG-2
4 G N D
5 FG-1
6 SWD 5V
7 ALWAYS 13V
8 G N D(MC)
9 D-PG
10 G N D
11 D-FG
12 ALWAYS 13V
13 H-VS
14 G N D(MH)
TO SY-A CN352
CN816
1 G N D
2
3 SF (EP) SW
4 FL.STOP.SW
5
6 SWD 5V
7 T.REEL.P
CN817
1 G N D
2
3 SF (EP) SW
4 FL.STOP.SW
5
6 SWD 5V
7 T.REEL.P
8 SW DATA 2
9 SW DATA 1
10 SW DATA 3
11 LM +
12 LM -
13 DEW.S
14
TO SY-A CN301
CN813
1 G N D
2 SW DATA 2
3 SW DATA 1
4 SW DATA 3
5 LM +
6 LM -
7 DEW.S
MC-2
ME.MO SW
M.L
CN823
1 G N D
2 SW DATA 2
3 SW DATA 1
4 SW DATA 3
5 LM +
6 LM -
7 DEW.S
DEW SENSOR
CN821
1 DEW.S
2 G N D
MC-3

SECTION 5
MECHANISM SERVICE TECHNICAL INFORMATION

1. OUTLINE OF MECHANISM

This mechanism is named P-88 Mechanism. Its features include :

(1) The chassis is fabricated by drawing a 1.6mm thick electric zinc plated steel sheet, and mechanical parts are ingeniously laid on this chassis. The mechanism is as thick as 70.3 mm, which indicates that it is 86 % thicker than conventional mechanisms hitherto available.

(2) After insertion of a cassette, the tape is normally wound to the head drum based on the full loading system. This design results in the shortening of the mode shift time, that is, the time from the depression of the PLAY pushbutton switch to the video image display on screen has been significantly quickened.

(3) The full loading system employed has the F/R search capability (when the same button (F.FWD or REW) is pressed in the F.FWD or REW modes, the search mode playback image appears on the screen).

(4) Also, a thin type head drum without lead is provided to increase the operating convenience of the equipment to a considerable extent.

(5) The drive source for cassette loading and the motor for the tape loading mode selection are used in combination with the head motor and the capstan motor for realization of a 3-motor system.

1-1. FULL LOADING MECHANISM

I. Quick playback
Mode shift time such as the STOP→PLAY and FF/REW→PLAY has been shortened for quicker playback.

II. High-speed VISS and VASS
The time from the detection of VISS/VASS search signal based on the VHS standardized search system till image display on the screen has considerably been shortened to make high-speed VISS and VASS possible.

(1) Description of full loading mechanism
As shown in Fig. 1-1 ⓐ, ⓑ, a tape has hitherto been wound onto the head drum only in the PLAY and F/R SEARCH mode, but in this radically new mechanism, in every mode can be made with the tape kept wound onto the head drum.

(2) Features of full loading mechanism
With the provision of the full loading mechanism, the operating convenience, which was hitherto a drawback of the VHS system, has been improved. A host of other salient features are also designed into this mechanism as apparent from the following description.

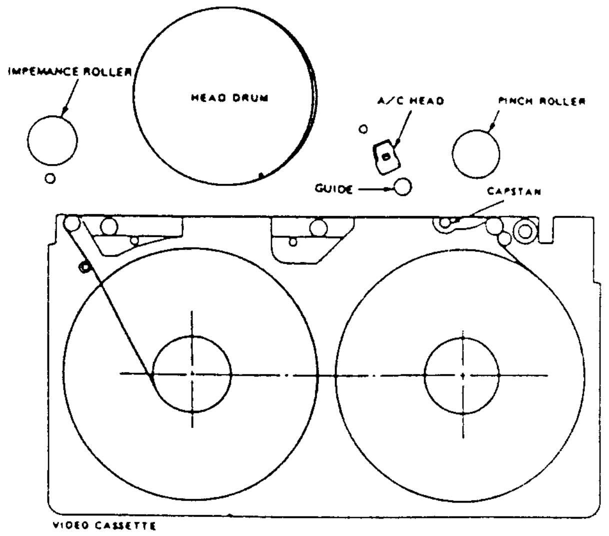


Fig. 1-1 ⓐ CONVENTIONAL VHS TAPE LOADING SYSTEM (AT FF/REW MODE)

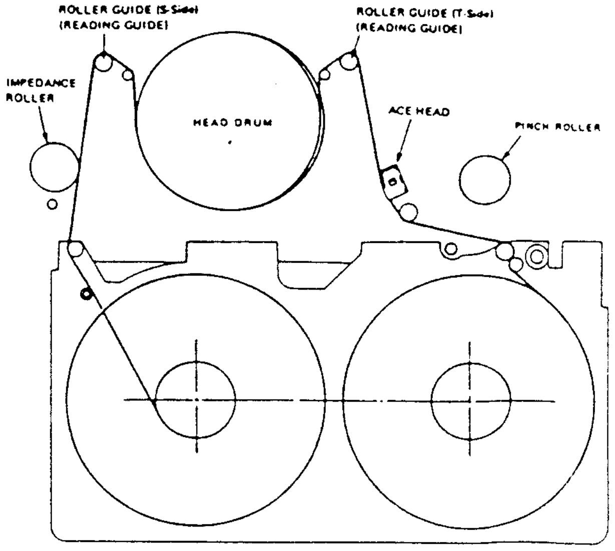


Fig. 1-1 ⓑ NEW FULL LOADING SYSTEM (AT FF/REW MODE)

III. F/R search

FF↔F-SEARCH and REW↔R-SEARCH can be made direct by reducing the mode transition

IV. Elimination of half loading mechanism

A special mechanism (the half loading mechanism in Fig. 1-2.) necessary for mounting the VISS/VASS functions and a realtime counter has hitherto been added to conventional models available, but the provision of the full loading mechanism simplifies the design of the mechanism, resulting in significantly enhanced reliability and increased convenience of operation.

(3) Protection mechanism for full loading system

I. Video Tape Protection Mechanism

(a) FF/REW→STOP

Tape tension applied to the head drum when stopping is lowered by optimizing the balance between the left and right, and brake forces acting on the left and right reel table. Thereby it prevents from causing a scratch on the tape due to V-head when stopping.

(b) STOP→FF/REW

The starting-up speed of the capstan motor is ingeniously designed to preclude the possibility of unusual tape tension at the time of REW/FWD start-up.

(c) Tape end brake damping

The design of the mechanism is so made that the time from issuance of an electrical STOP command till actual brake application is reduced to a minimum. This enable the braking to be completed before the reader tape end.

(d) FF/REW running

To ensure highly stable tape running in any condition and any environment, design consideration is given to the foundation brake torque (soft brake) to the reel table and the tape winding angle with respect to each tape guide. Particularly in regard to the supply side fixing guide and F.T.E (Full Track Erase) head, the design is so made that they do not come into contact with the tape at the time of FF/REW operation to alleviate load application.

II. Final End Position Tape Loading Protection Mechanism

Tape pull-out (loading) from within the cassette is done to ensure proper take-up of the tape onto the head drum. At that time, the tape is extended from the supply reel side.

So, if the tape is wound to the final end, no loading can be made. For this reason, a mode is designed to allow the tape to be rewound a little at the final end of the tape without any loading done.

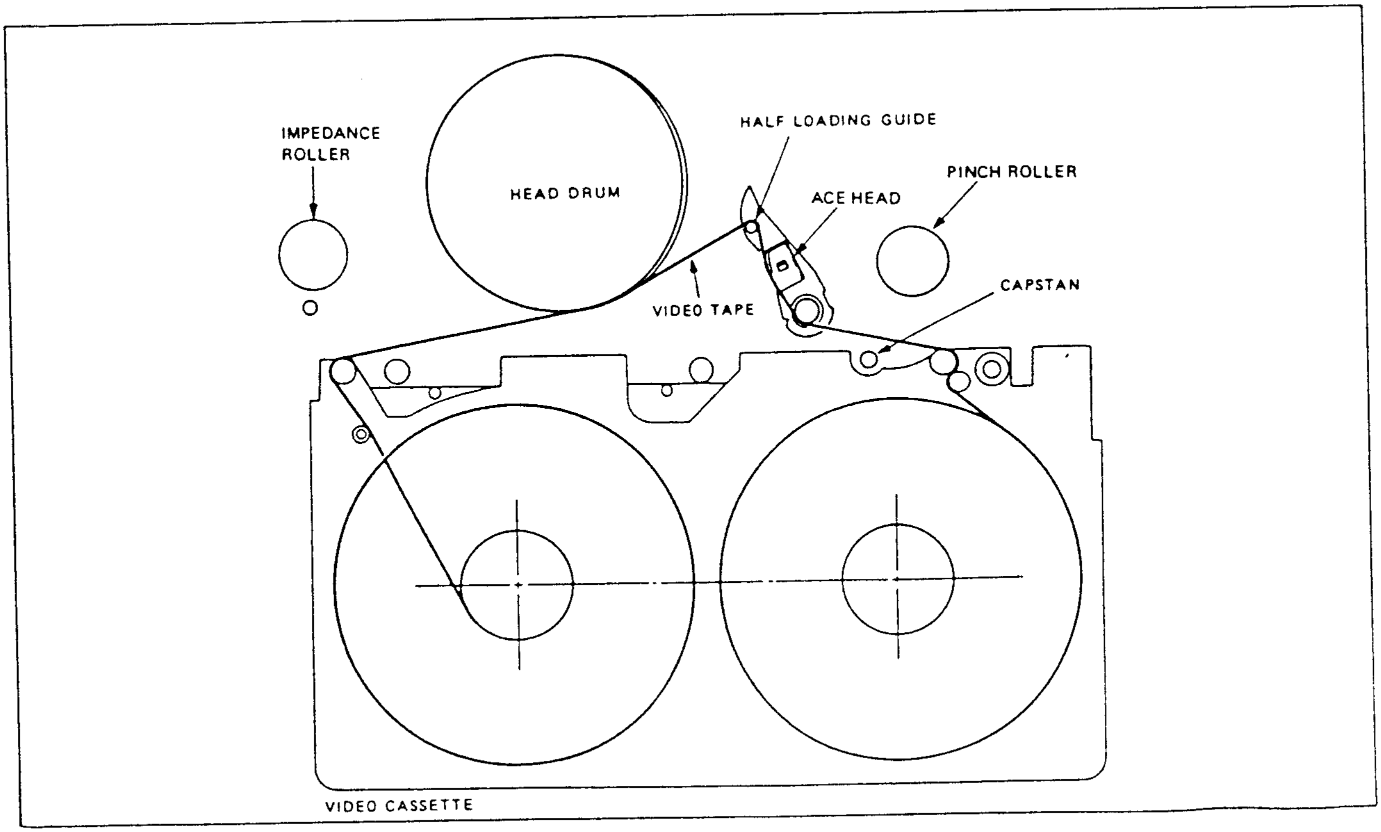


Fig. 1-2 HALF LOADING SYSTEM (AT FF/REW MODE)

2. DESCRIPTION OF MECHANISM OPERATION

2-1. BASIC OPERATION MODE OF MECHANISM

The P-88 mechanism has its original modes such as given in Table 2-1, in addition to the VTR is operation modes (STOP, FF, REW, PLAY, REC, R-SEARCH, F-SEARCH, STILL, SLOW, and ETS). These modes specific to the mechanism play important roles in tape protection operation at the time of a shift to various modes of the VTR above. A shift to the mode specific to the mechanism is carried out by controlling the rotation of the loading motor with the control signal of the system control circuit. The detection of important mechanism operation mode positions is done by using the FL START SWITCH for detecting the cassette ejection/insertion, the FL END SWITCH for detecting the cassette insert completion, and the MECHANISM MODE SWITCH for detecting each mode of the mechanism (3 bit MODE DATA is output by operating the rotary switch).

Mechanism Mode	Mechanism Mode Switch			HEX DATA	Function	VTR Operation Mode
	3	2	1			
EJECT	-	-	-		Eject position	EJECT
					Front loading/Unloading	
SHORT REW	-	-	-		Take up operation in the tape end position	Detected by FL END switch
INITIAL	1	1	1	⑦	Power off position	Power off when tape is loaded completely
					Tape unloading position Tape loading Tape loading ending position	
BRAKE	0	0	1	①	Main brake applying position	
STOP / FF/REW	0	1	0	②	STOP waiting and FF/REW (the head motor rotation)	STOP, FF/REW
STILL	0	1	1	③	The positions of STILL, SLOW or F-ADV.	STILL, SLOW, F-ADV
PLAY	1	0	0	④	From FWD direction Normal running mode	PLAY, REC, F-SEARCH
IDLER	1	0	1	⑤	Forward/reverse changeover position	PAUSE
REV	1	1	0	⑥	From REV direction Normal running mode	R-SERACH

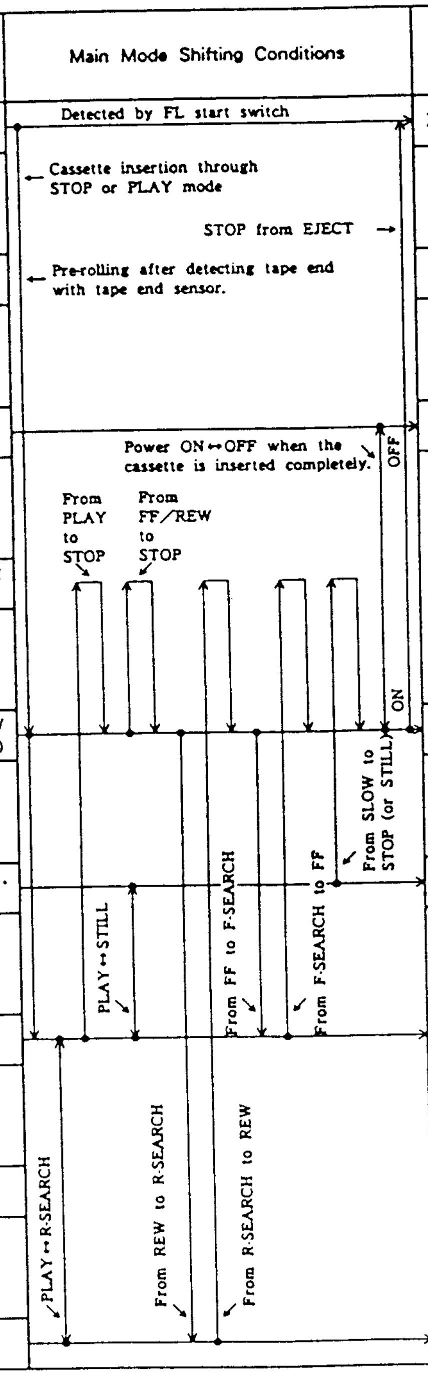

Main Mode Shifting Conditions
Detected by FL start switch
Cassette insertion through STOP or PLAY mode
STOP from EJECT
Pre-rolling after detecting tape end with tape end sensor.
Power ON↔OFF when the cassette is inserted completely.
OFF
ON
From PLAY to STOP
From FF/REW to STOP
From SLOW to STOP (or STILL)
PLAY↔STILL
From FF to F-SEARCH
From F-SEARCH to FF
PLAY↔R-SEARCH
From REW to R-SEARCH
From R-SEARCH to REW

Table 2-1

2-2. DESCRIPTION OF MECHANISM DRIVE

To realize the thin type mechanism, a loading motor and two pieces of cam (MAIN CAM GEAR and the MODE CAM GEAR) to be driven by the said motor are mounted on the upper part of the capstan motor, that was a dead space in the conventional mechanisms hitherto available with a view to optimization of parts mounting layout. (Fig. 2-1 and Fig. 2-2.)

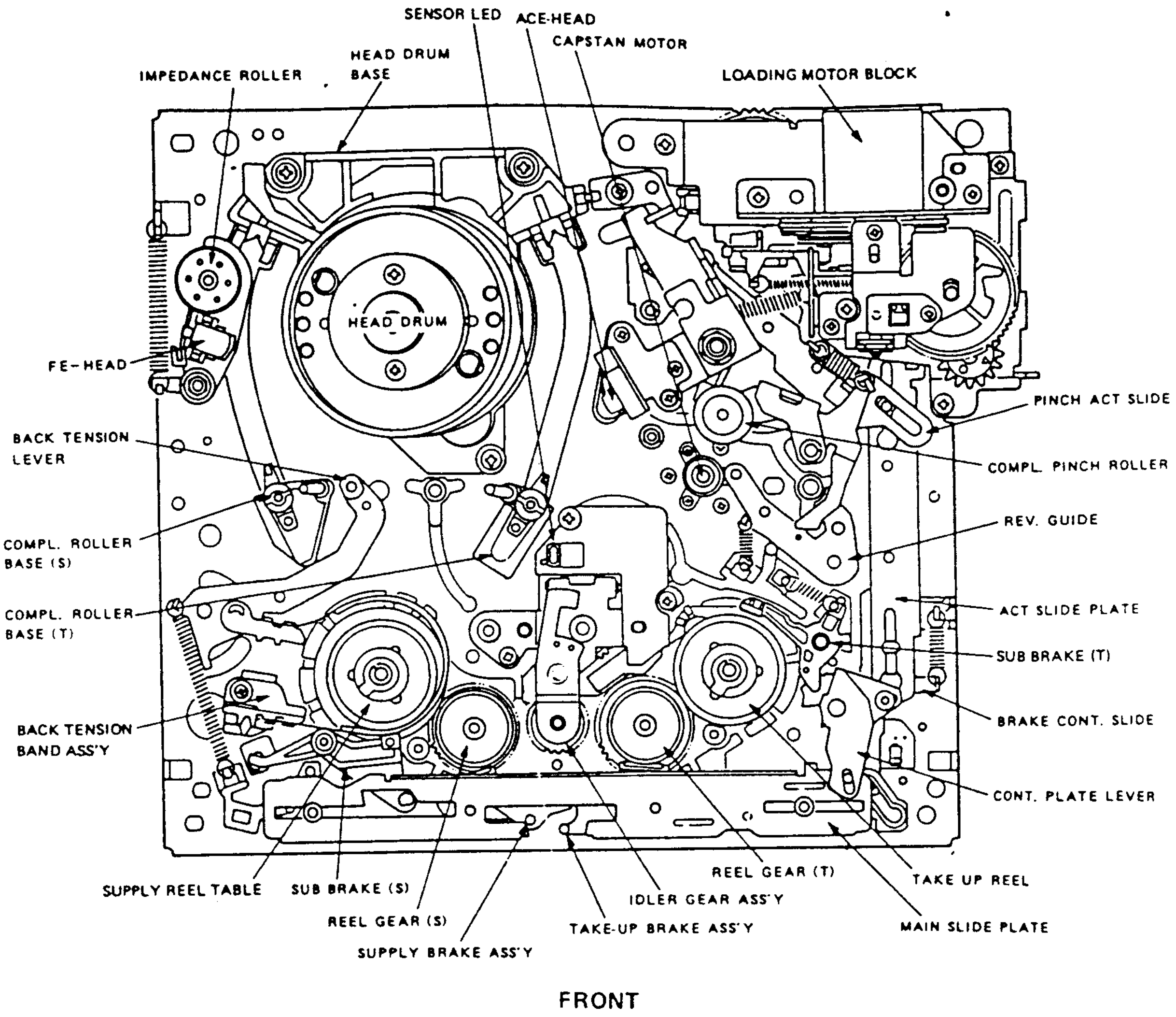

SENSOR LED
ACE-HEAD
CAPSTAN MOTOR
HEAD DRUM BASE
IMPEDANCE ROLLER
LOADING MOTOR BLOCK
HEAD DRUM
FE-HEAD
PINCH ACT SLIDE
BACK TENSION LEVER
COMPL. PINCH ROLLER
REV. GUIDE
COMPL. ROLLER BASE (S)
ACT SLIDE PLATE
COMPL. ROLLER BASE (T)
SUB BRAKE (T)
BRAKE CONT. SLIDE
BACK TENSION BAND ASS'Y
CONT. PLATE LEVER
REEL GEAR (T)
TAKE UP REEL
SUPPLY REEL TABLE
SUB BRAKE (S)
IDLER GEAR ASS'Y
REEL GEAR (S)
TAKE-UP BRAKE ASS'Y
MAIN SLIDE PLATE
SUPPLY BRAKE ASS'Y
FRONT

Fig. 2-1 TOP VIEW OF MECHANINSM

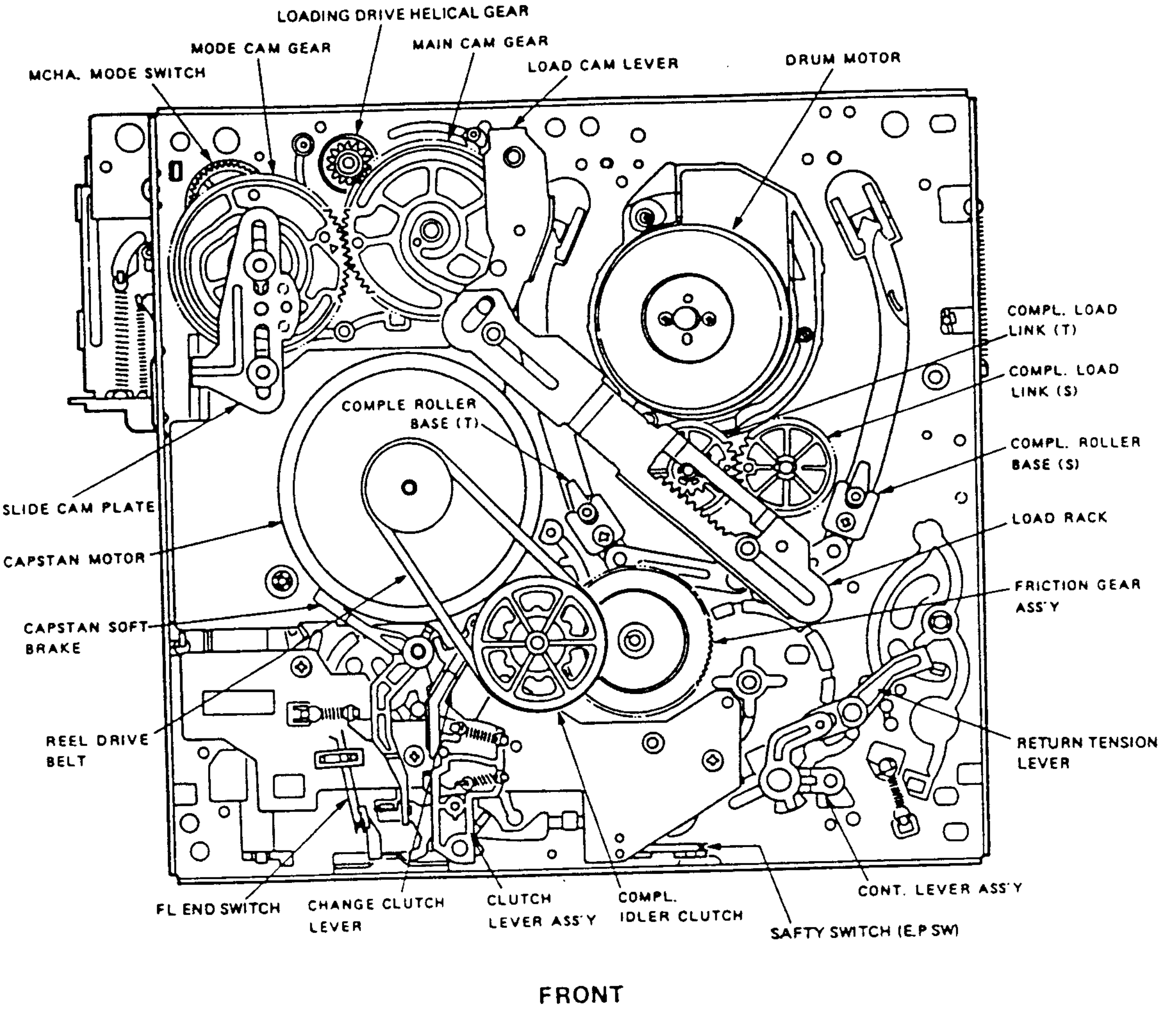

LOADING DRIVE HELICAL GEAR
MODE CAM GEAR
MAIN CAM GEAR
MCHA. MODE SWITCH
LOAD CAM LEVER
DRUM MOTOR
COMPL. LOAD LINK (T)
COMPL. LOAD LINK (S)
COMPLE ROLLER BASE (T)
COMPL. ROLLER BASE (S)
SLIDE CAM PLATE
LOAD RACK
CAPSTAN MOTOR
FRICTION GEAR ASS'Y
CAPSTAN SOFT BRAKE
REEL DRIVE BELT
RETURN TENSION LEVER
FL END SWITCH
CHANGE CLUTCH LEVER
CLUTCH LEVER ASS'Y
COMPL. IDLER CLUTCH
CONT. LEVER ASS'Y
SAFTY SWITCH (E.P SW)
FRONT

Fig. 2-2 BOTTOM VIEW OF MECHANISM

These two cams have one CAM GROOVE on both sides. A total of four CAM GROOVEs performs independent functions to meet the multi-function needs of these days by driving the elements of a wide variety of functions with the motor precisely controlled by a microcomputer.

The two cams are positive motion cams having a groove over 570 degrees. These cams cause the amount of lift to be changed by a mild gradient according to the angle of rotation while synchronizedly being rotated by an outer circumferential gear to alleviate the load exerted on the cams when driving the rod linked with the cams and also to ensure position stability in each mode of operation. The geometry of each cam and that of a metal fitting of the drive section are shown in Fig. 2-3 and Fig. 2-4, respectively. Also, the role of each cam used is described below.

On the GROOVE 3 side of MODE CAM GEAR have a small gear. This small gear is engaged with the MECHANISM MODE SWITCH as shown in Fig. 2-3., and detect the mechanism operation mode. In this way, the two cams and the MECHANISM MODE SWITCH are rotated synchronously, and the mechanism is fully synchronized and driven for each mode.

MAIN CAM GEAR : CAM GROOVE 1.
Pinch roller pressing operation
CAM GROOVE 2.
Tape loading mechanical drive
MODE CAM GEAR : CAM GROOVE 3.
Brake and clutch selecting operation
CAM GROOVE 4.
Brake control and front unloading control

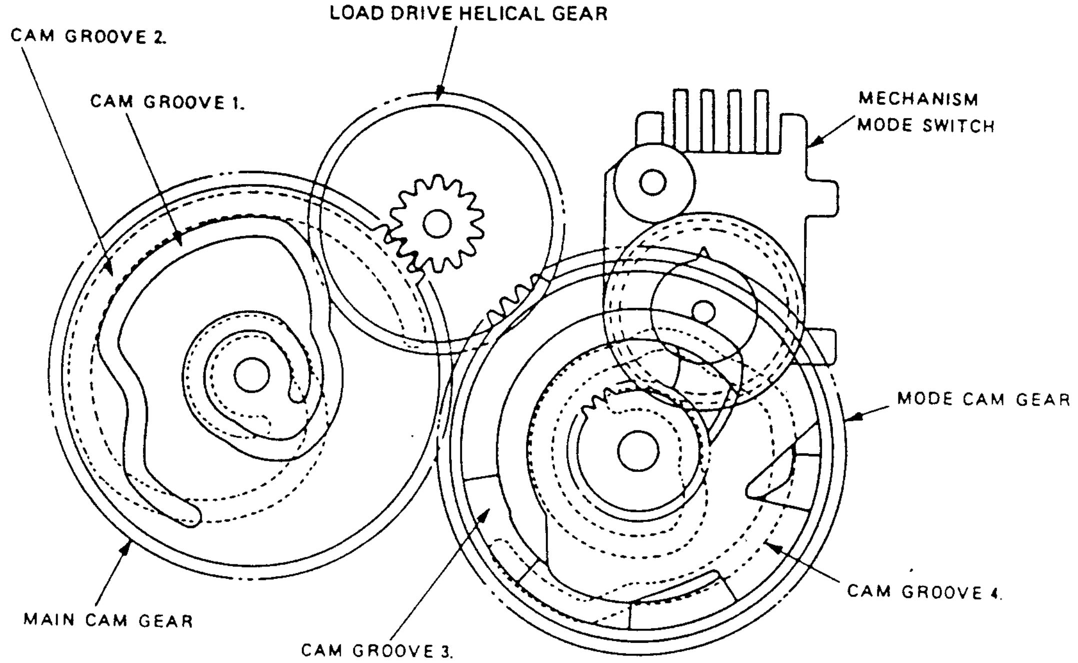


Fig. 2-3 PLAN OF CAMS CONSTRUCTION

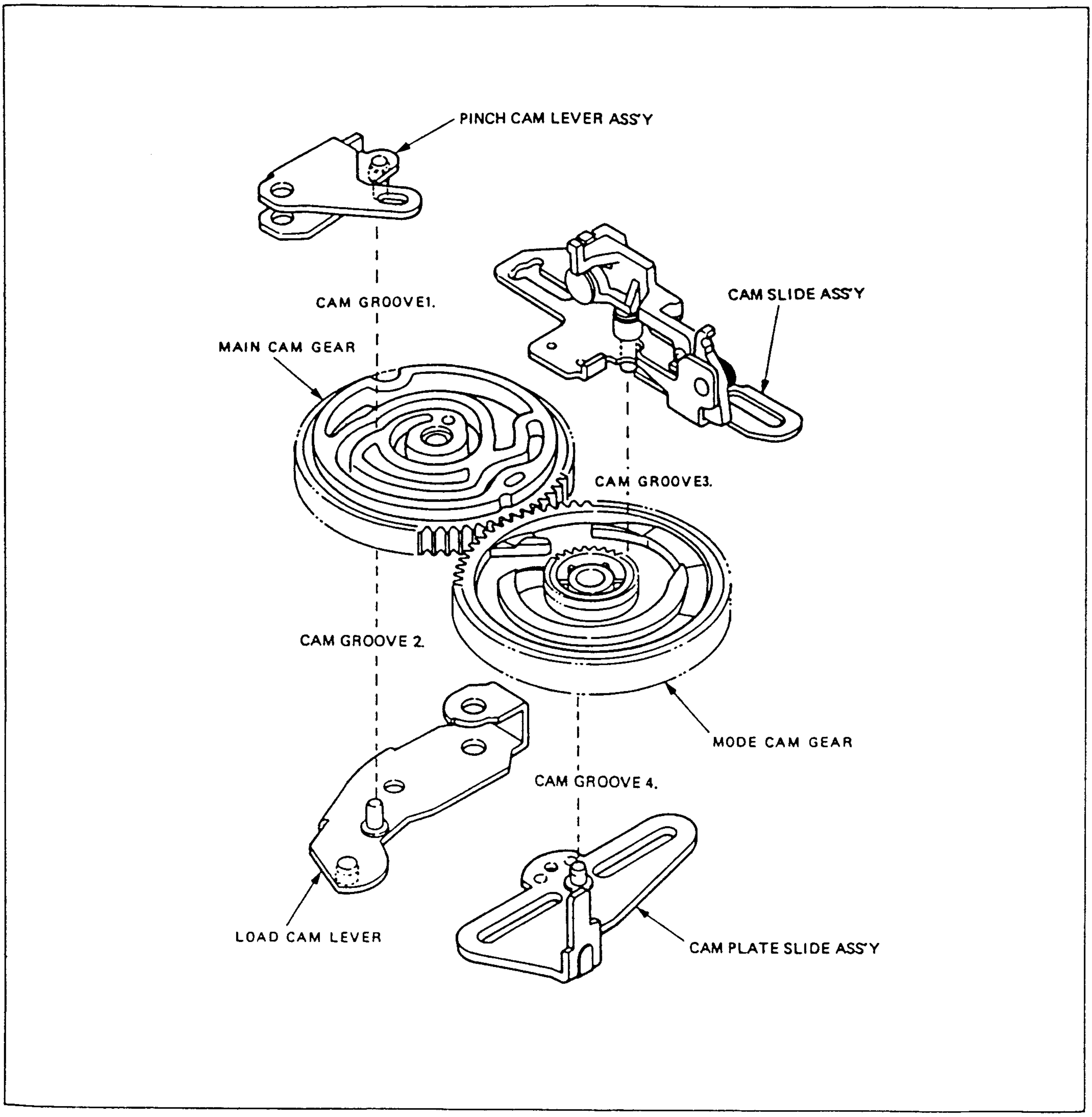

PINCH CAM LEVER ASS'Y
CAM SLIDE ASS'Y
CAM GROOVE1.
MAIN CAM GEAR
CAM GROOVE3.
CAM GROOVE 2.
MODE CAM GEAR
CAM GROOVE 4.
LOAD CAM LEVER
CAM PLATE SLIDE ASS'Y

Fig. 2-4 VIEW OF CAMS CONSTRUCTION

2-2-1. Tape Loading Mechanism
The tape loading mechanism is compactly designed with use of a LOAD RACK for loading by drive from the before-mentioned MAIN CAMs with CAM GROOVE 2. The LOAD RACK is laid on the dead space in between the DD capstan motor and the head motor for effective space utilization.(Fig. 2-5) The process from tape pull-out upon loading to contact of the leading guide section with the stopper of drum base and press-fitting under tension of spring is guided and driven in such a manner that the rod is drawn inward from the outer circumferential direction of the CAM GROOVE 2, thereby reducing the load torque (PV value) to the CAM GROOVE. And, the load of the loading motor is minimized to enhance reliability.

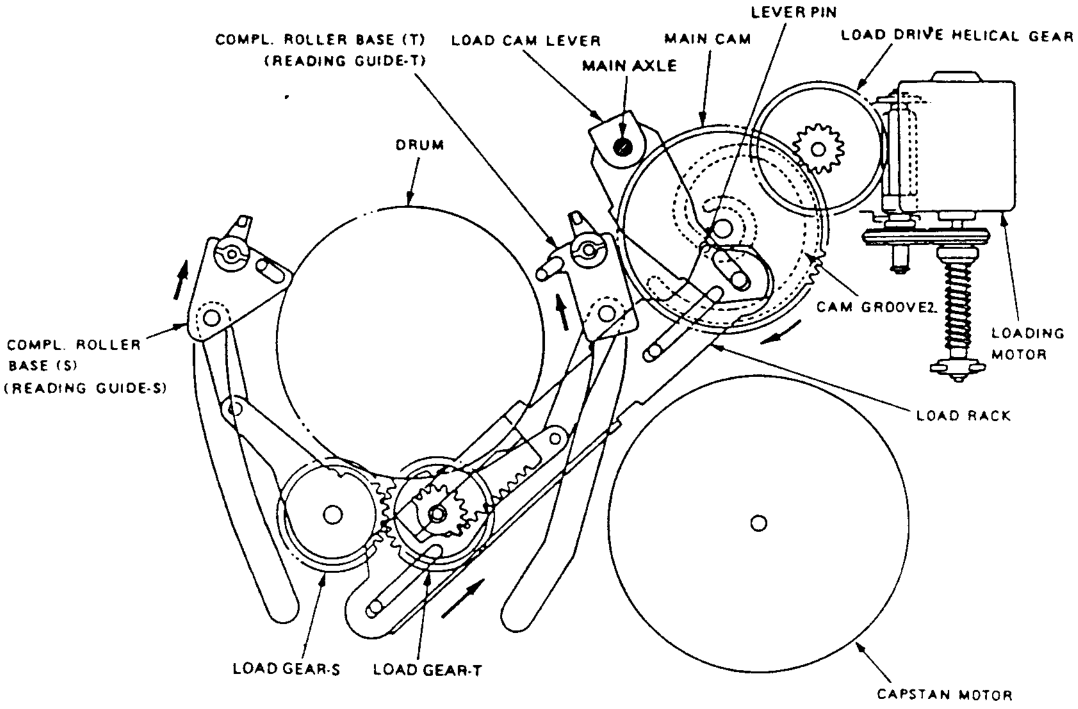

LEVER PIN
COMPL. ROLLER BASE (T)
(READING GUIDE-T)
LOAD CAM LEVER
MAIN CAM
LOAD DRIVE HELICAL GEAR
MAIN AXLE
DRUM
CAM GROOVE2
LOADING MOTOR
COMPL. ROLLER BASE (S)
(READING GUIDE-S)
LOAD RACK
LOAD GEAR-S
LOAD GEAR-T
CAPSTAN MOTOR

Fig. 2-5 CONSTRUCTION OF TAPE LOADING MECHANISM

2-2-2. Pinch Roller Pressing Mechanism

The PINCH LEVER assembly of the pinch roller is operated by the PINCH CAM LEVER (rod) driven by the CAM GROOVE 1 of the before-mentioned MAIN CAM, and then press-fitted to the capstan. The revolving tape guide (REV.GUIDE) is interlockingly operated with the PINCH LEVER assembly to ensure stable tape running at a fixed speed. (Fig. 2-6)

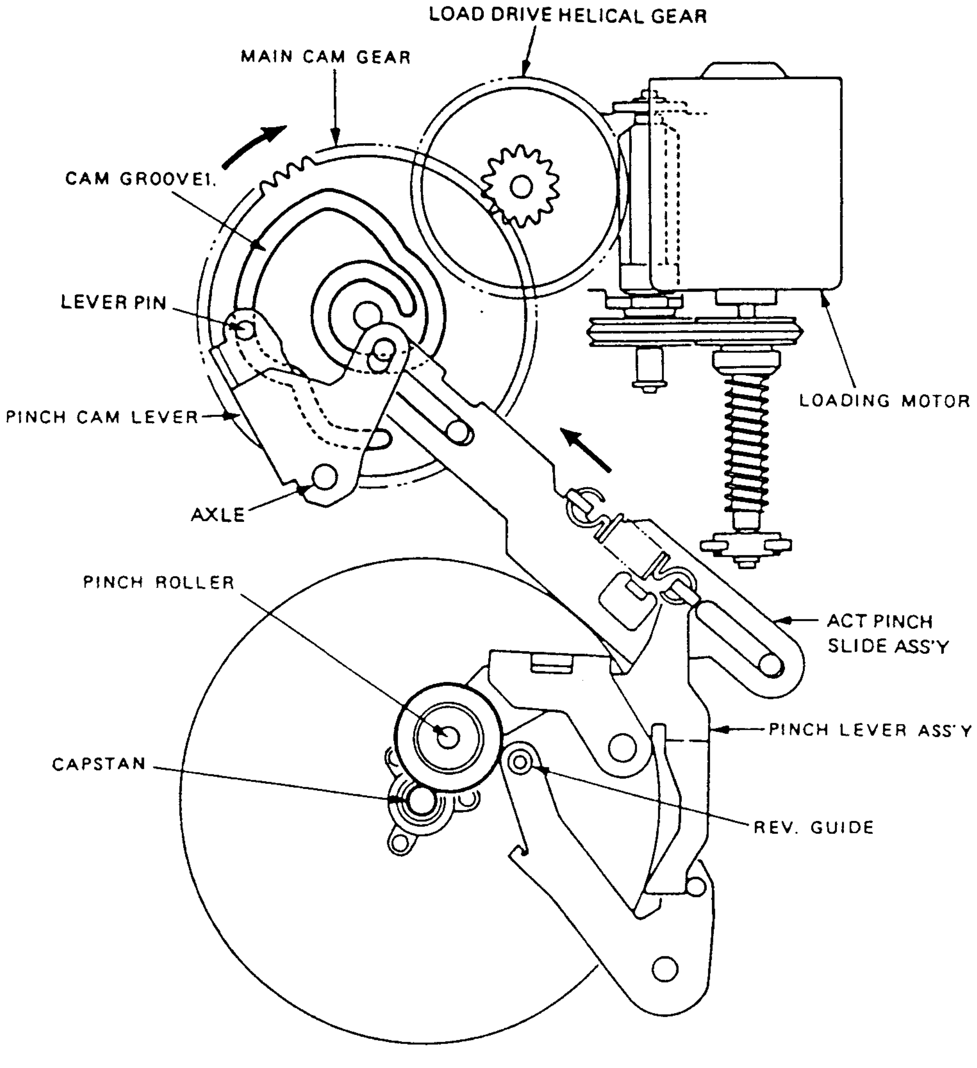

LOAD DRIVE HELICAL GEAR
MAIN CAM GEAR
CAM GROOVE1.
LEVER PIN
PINCH CAM LEVER
AXLE
PINCH ROLLER
CAPSTAN
LOADING MOTOR
ACT PINCH SLIDE ASS'Y
PINCH LEVER ASS'Y
REV. GUIDE

Fig. 2-6 CONSTRUCTION OF PINCH ROLLER MECHANISM

2-2-3. Operation of Brake Control Plate

The ACT SLIDE PLATE and the MAIN SLIDE PLATE shown in Fig. 2-7 is driven by the CAM GROOVE 4 of the MODE CAM GEAR for precise control of operations including the control of back tension lever, auxiliary brake (SUB BRAKE S/T), main brake (SUPPLY BRAKE and TAKE-UP BRAKE), clutch selection, FL END SWITCH selection, and drive selection of front loading mechanism.

Also, the mechanism mode switch is engaged with the small gear of the MODE CAM GEAR for sync rotation. At the time, the detection position of each mode is set so that it becomes the flat section at the cam curve of the CAM GROOVE 4 of the MODE CAM GEAR. So, even if motor stop time deviation occurs due to the load following the detection of the loading motor stop position, the control plate linked with a stop in the specified position.

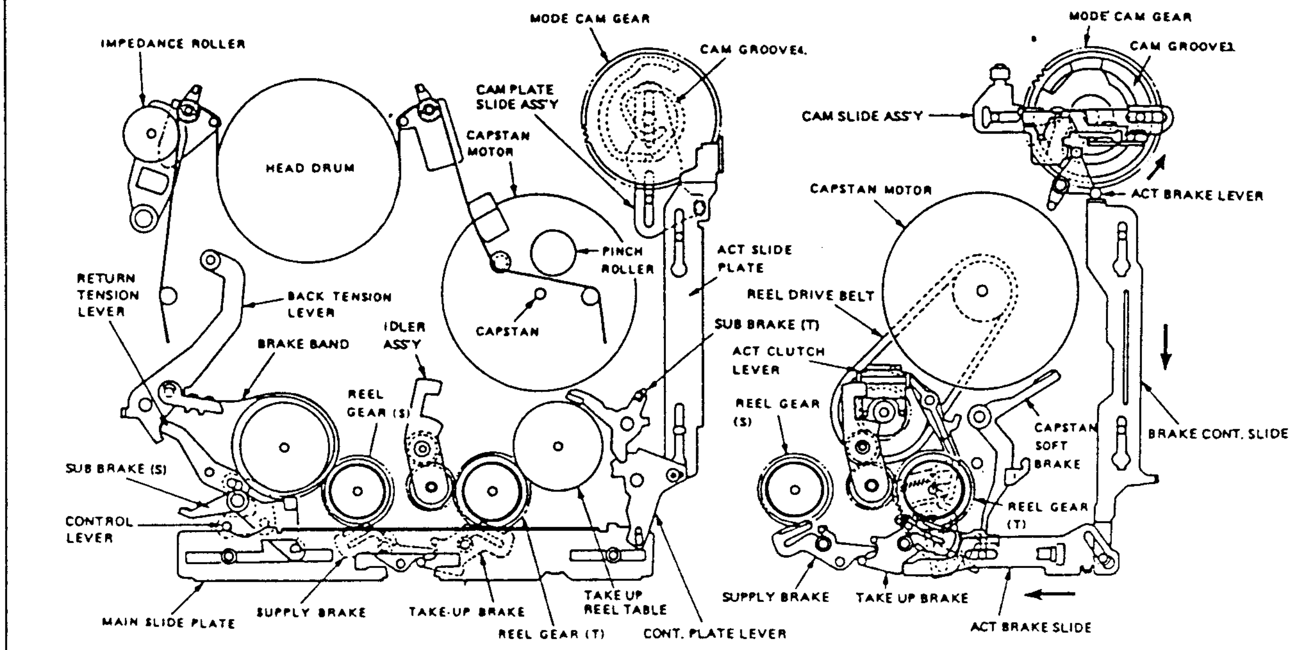

IMPEDANCE ROLLER
HEAD DRUM
MODE CAM GEAR
CAM GROOVE4.
CAM PLATE SLIDE ASS'Y
CAPSTAN MOTOR
PINCH ROLLER
CAPSTAN
ACT SLIDE PLATE
RETURN TENSION LEVER
BACK TENSION LEVER
BRAKE BAND
IDLER ASS'Y
REEL GEAR (S)
SUB BRAKE (S)
CONTROL LEVER
MAIN SLIDE PLATE
SUPPLY BRAKE
TAKE-UP BRAKE
REEL GEAR (T)
TAKE UP REEL TABLE
CONT. PLATE LEVER
MODE CAM GEAR
CAM GROOVE1
CAM SLIDE ASS'Y
ACT BRAKE LEVER
CAPSTAN MOTOR
REEL DRIVE BELT
SUB BRAKE (T)
ACT CLUTCH LEVER
REEL GEAR (S)
CAPSTAN SOFT BRAKE
BRAKE CONT. SLIDE
REEL GEAR (T)
SUPPLY BRAKE
TAKE UP BRAKE
ACT BRAKE SLIDE

Fig. 2-7 CONSTRUCTION OF BRAKE CONTROL PLATE (AT REW/FF, STOP MODE)

2-2-4. Brake Control Mechanism

The mechanical logic of the brake state is shown in Fig. 2-8. The brake which damps the reel rotation is operated by the BRAKE CONTROL SLIDE driven from the CAM GROOVE 3 of the MODE CAM GEAR.

Also, to alleviate damage to the tape caused by high tension of the brake in operation, the tape is stopped after brake operation and the shape is thoughtfully designed for proper biting-in ratio of the left and the right brakes after-mentioned to each other.
This enables the supply brake to be released by the operation of the above-mentioned MAIN SLIDE PLATE after an elapse of prefixed slight time to reduce the tape tension to zero, and to provide the tape with a proper degree of looseness. As a result, a slight gap is created in the tape from the HEAD DRUM.

Further, a momentary still mechanism which dispenses with use of a plunger solenoid is not provided as one of design features of the P-88 mechanism.
To stabilize the image in an extremely short period of time during a shift to the STILL mode from the PLAY mode, the auxiliary brake (CAPSTAN SOFT BRAKE) is press-fit to the outer circumference of the capstan motor by the before-mentioned CAM GROOVE 3 of the MODE CAM GEAR.
These operations is interlocked with the operation of the before-mentioned ACT SLIDE PLATE and the MAIN SLIDE PLATE. It consists of one MODE CAM for offsetting the operating position.

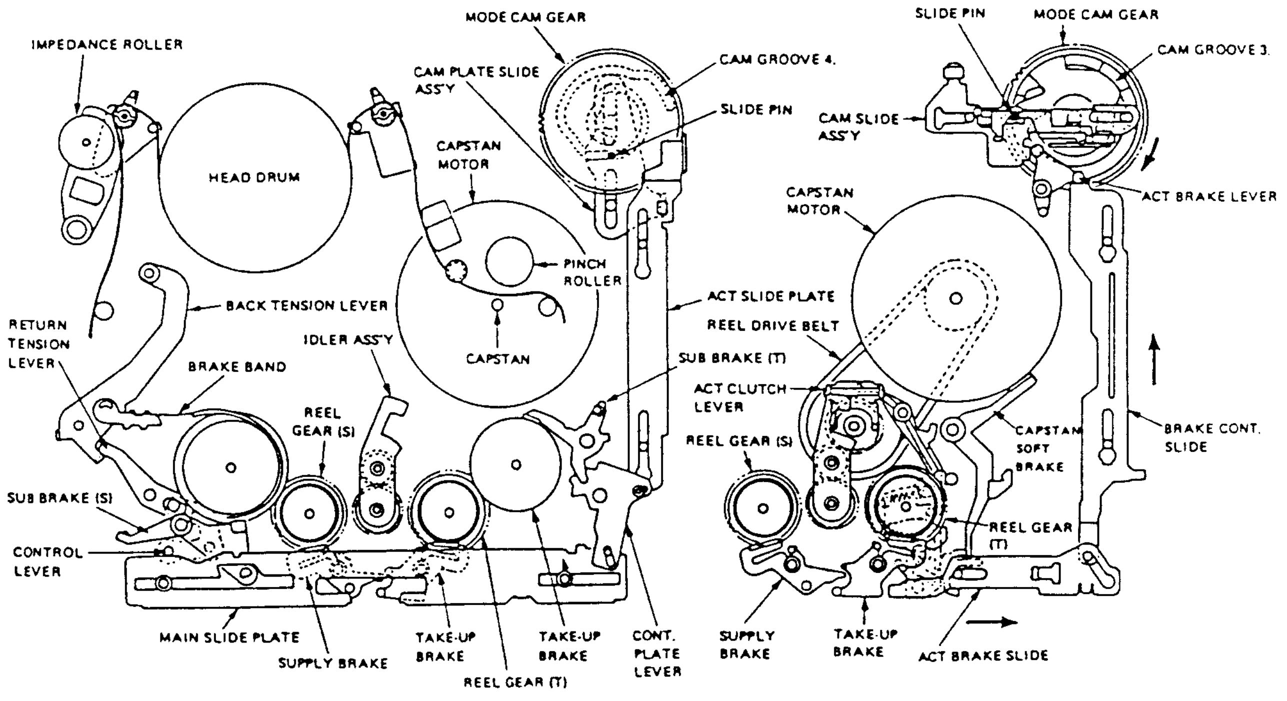

MODE CAM GEAR
IMPEDANCE ROLLER
CAM PLATE SLIDE ASS'Y
CAM GROOVE 4.
SLIDE PIN
CAPSTAN MOTOR
HEAD DRUM
PINCH ROLLER
BACK TENSION LEVER
RETURN TENSION LEVER
IDLER ASS'Y
CAPSTAN
BRAKE BAND
REEL GEAR (S)
SUB BRAKE (S)
CONTROL LEVER
MAIN SLIDE PLATE
SUPPLY BRAKE
TAKE-UP BRAKE
REEL GEAR (T)
TAKE-UP BRAKE
CONT. PLATE LEVER
ACT SLIDE PLATE
SLIDE PIN
MODE CAM GEAR
CAM GROOVE 3.
CAM SLIDE ASS'Y
ACT BRAKE LEVER
CAPSTAN MOTOR
REEL DRIVE BELT
SUB BRAKE (T)
ACT CLUTCH LEVER
REEL GEAR (S)
CAPSTAN SOFT BRAKE
BRAKE CONT. SLIDE
REEL GEAR (T)
SUPPLY BRAKE
TAKE-UP BRAKE
ACT BRAKE SLIDE

Fig. 2-8 CONSTRUCTION OF BRAKE CONTROL PLATE (AT BRAKE MODE)

2-2-5. Brake Lock Release Mechanism (FF/REW→STOP Mode)

The brake lock momentary release mechanism is shown in Fig. 2-9 ⓐ, ⓑ and Fig. 2-10.

In the FF/REW mode (Fig. 2-9 ⓐ) mechanical elastic load is given to the BRAKE LOCK LEVER mounted on the BRAKE CAM SLIDE which causes the brake to operate, and it is locked to the high-speed rotary axle of the 1st reducing section of the loading motor.

ⓐChanges from brake mode or lock released state to FF/REW, STOP mode.

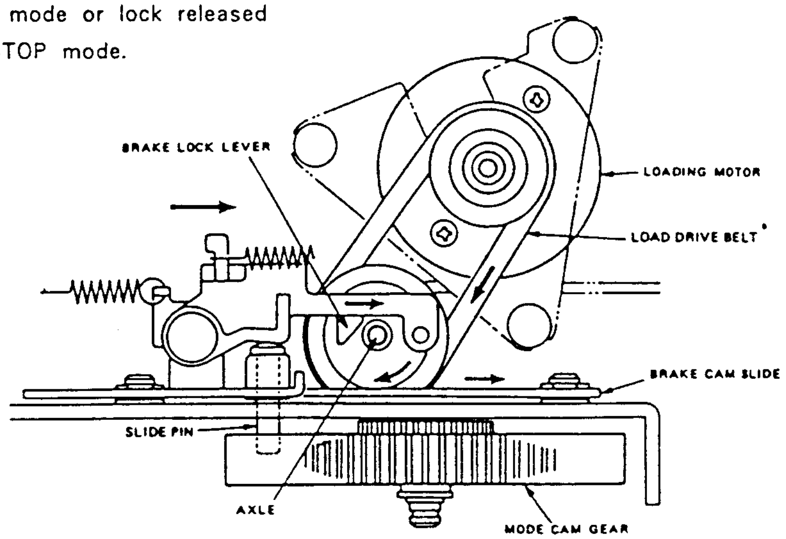

BRAKE LOCK LEVER
LOADING MOTOR
LOAD DRIVE BELT*
BRAKE CAM SLIDE
SLIDE PIN
AXLE
MODE CAM GEAR

Fig. 2-9 ⓐ BRAKE LOCK & RELEASE MECHANISM

At the time of a shift to the STOP mode from the FF/REW (Fig. 2-9 ⓑ), the BRAKE LOCK LEVER releases the lock on slight rotation of the axle by contact between the rotary shaft and the friction resistance so that the brake can be instantaneously applied to the reel. The lock release speed is almost the same as the start-up of the loading motor. So, the its response to the brake is very quick, and construction is simplified also.

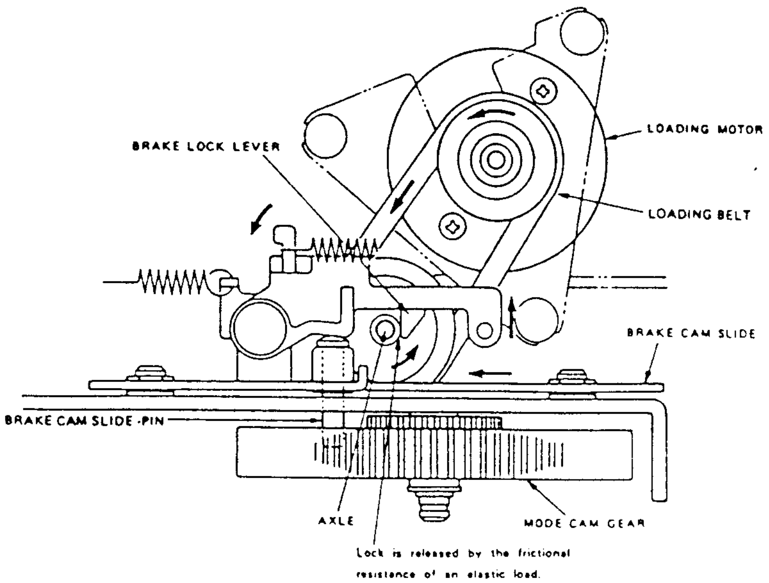

BRAKE LOCK LEVER
LOADING MOTOR
LOADING BELT
BRAKE CAM SLIDE
BRAKE CAM SLIDE-PIN
AXLE
MODE CAM GEAR
Lock is released by the frictional resistance of an elastic load.

Fig. 2-9 ⓑ BRAKE LOCK & RELEASE MECHANISM

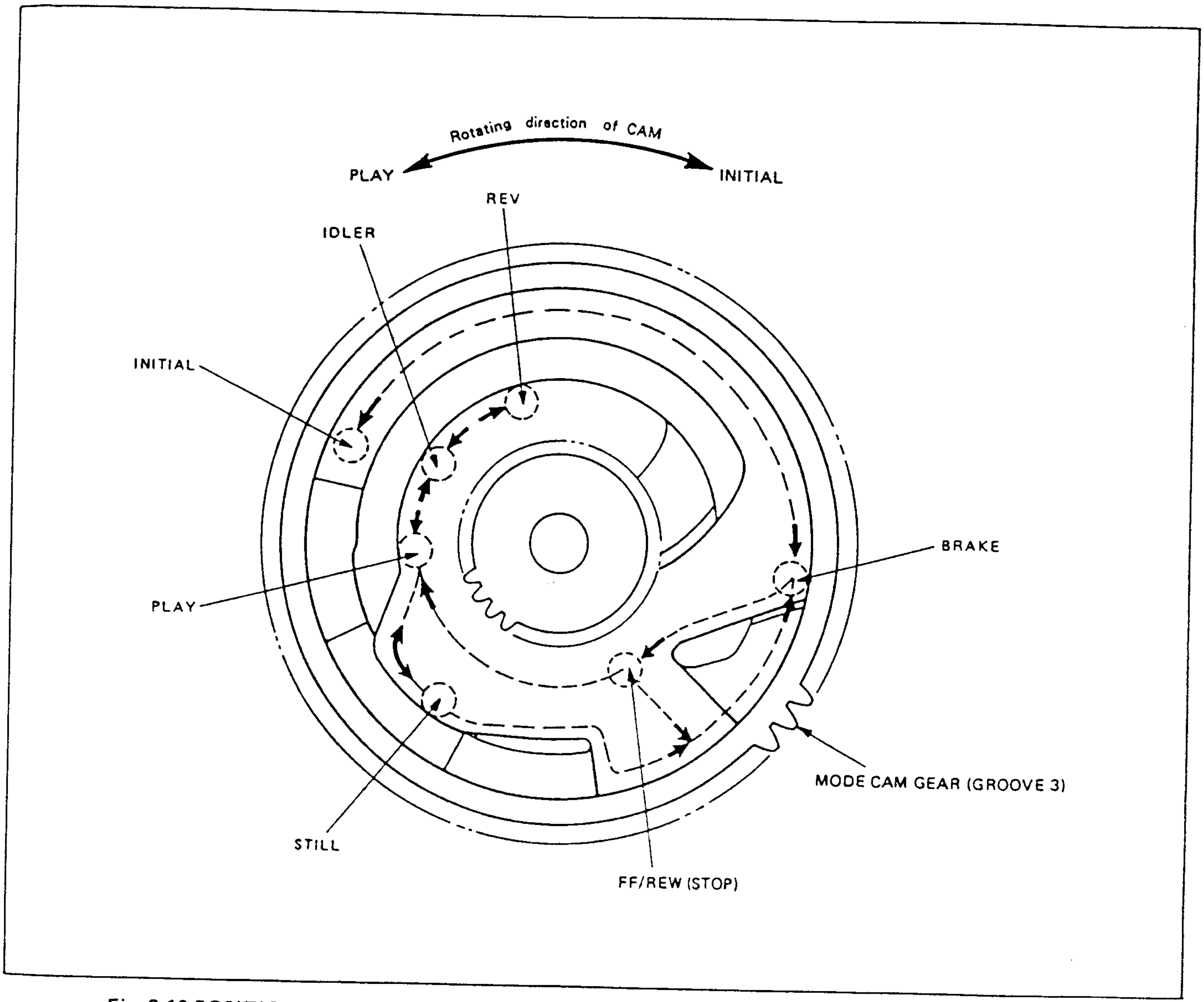

Rotating direction of CAM
PLAY
INITIAL
REV
IDLER
INITIAL
BRAKE
PLAY
MODE CAM GEAR (GROOVE 3)
STILL
FF/REW (STOP)

Fig. 2-10 POSITIONING OF BRAKE CAM SLIDE-PIN ON THE GROOVE 3 OF MODE CAM GEAR

2-3. REEL TABLE DRIVE

2-3-1. Reel Table Drive Mechanism

This mechanism employs the system of driving the tape from the DD capstan motor via rubber belt. In the tape constant speed running mode for PLAY, F-SEARCH, and R-SEARCH, the capstan and the pinch roller are press-fitted to allow the tape to run at a constant speed. By providing a FRICTION MECHANISM in between the capstan motor and the reel table, the tape is taken up. In the FF/REW tape high-speed take-up mode, the capstan and the pinch roller are separated from each other, and the capstan motor and the reel table are linked direct by the clutch mechanism to carry out tape take-up. Also, to realize a thin type reel table drive section, the mechanism is simplified and the rotary parts are thinned for realization of physically compact design, and a step is provided on the reel table mounting section of the chassis by high-precision drawing process. A simplified figure of the drive mechanism is shown in Fig. 2-11 and Fig. 2-12. Power transmission to the pulley of the clutch mechanism section is done from the DD capstan motor via rubber belt.

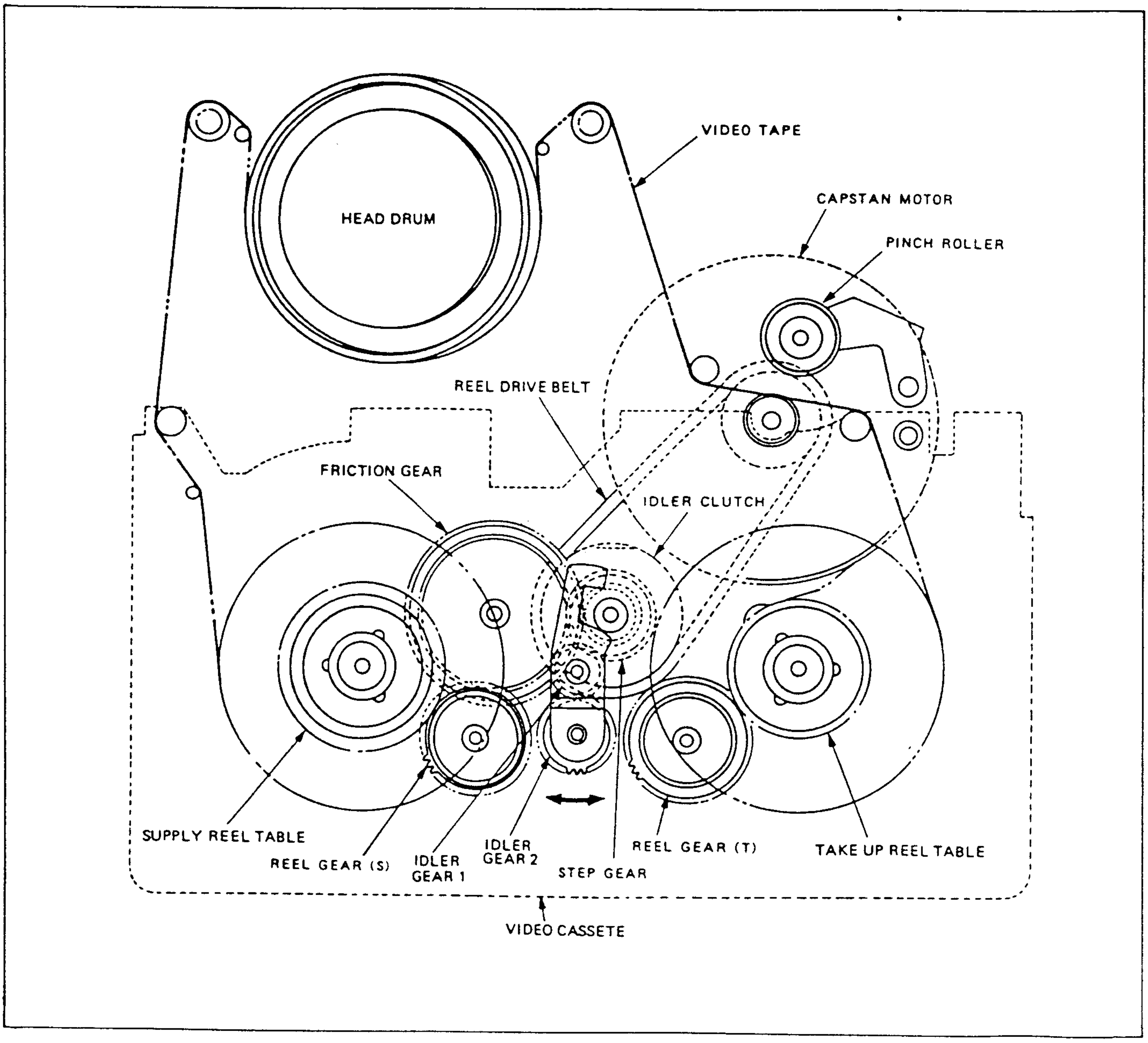

VIDEO TAPE
CAPSTAN MOTOR
HEAD DRUM
PINCH ROLLER
REEL DRIVE BELT
FRICTION GEAR
IDLER CLUTCH
SUPPLY REEL TABLE
REEL GEAR (S)
IDLER GEAR 1
IDLER GEAR 2
STEP GEAR
REEL GEAR (T)
TAKE UP REEL TABLE
VIDEO CASSETE

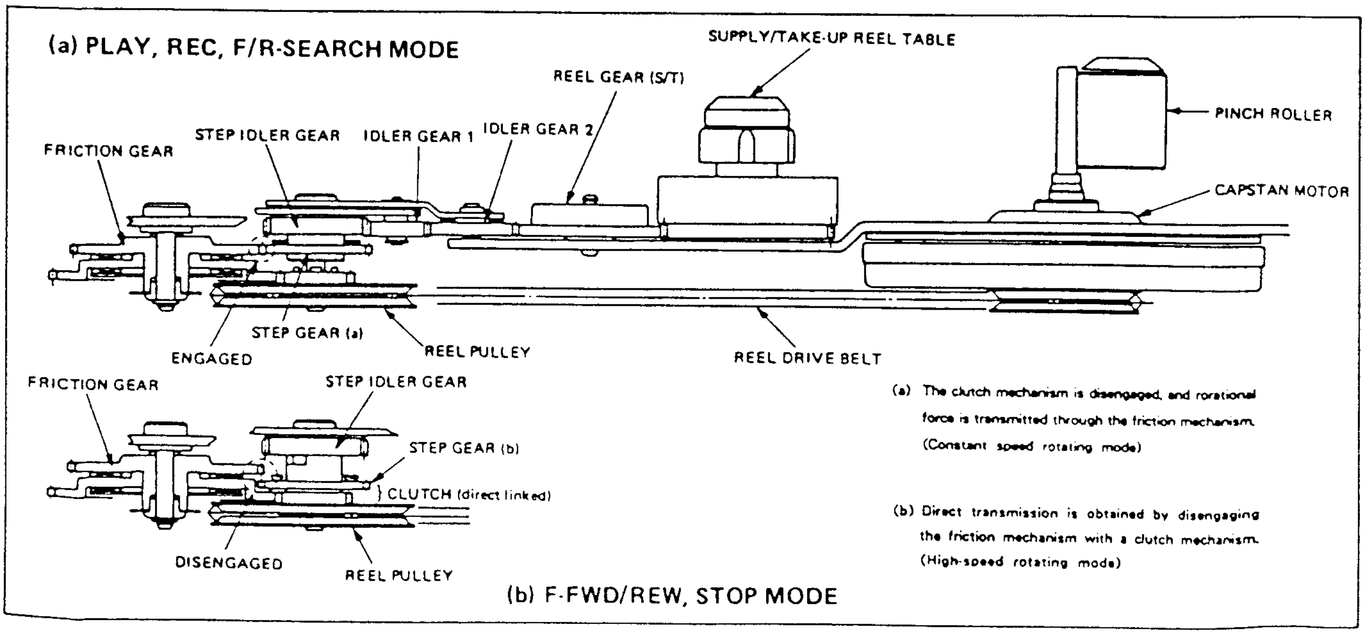
Fig. 2-11 REEL TABLE DRIVE

At that time, the reel table winding speed and the torque needed in a wide variety of modes are obtained by shifting the up and down STEP GEAR positioned at the upper section of pulley. The selection of the STEP GEAR is precision controlled by the MODE CAM GEAR via the BRAKE CONTROL SLIDE. With the up and down STEP GEAR down, the clutch mechanism is direct linked, and the transmission power from the capstan motor is sent to the reel table via IDLER GEAR assembly and REEL GEAR (S/T). On the other hand, FRICTION MECHANISM acts between the pulley and the STEP GEAR when the up and down STEP GEAR are in the elevated state, thereby controlling the transmission torque for generation of the take-up slip. Normally, it is desirable that the take-up torque of the reel table is higher in the R-SEARCH mode than that in the PLAY mode. This is because in the forward tape running the tape winding load to the HEAD DRUM has to be taken care of the capstan and the pinch roller.

While, in the reverse tape running mode the winding load has to be taken on the take-up reel table. In the special playback operation, a mechanism for varying the take-up torque of the reel table is required to be changed depending upon the running direction of the tape. But in this mechanism, the torque selection is made by varying the reduction speed ratio up to the reel table from the capstan motor on both the forward side and the reverse side of the tape. Also, design simplification of the selection mechanism is realized by using a single friction mechanism. In other words, the take-up torque necessary for forward/reverse rotation is obtained by controlling the capstan motor speed.

Rotation speed and torque needed for each mode of operation are converted by clutch mechanism for transmission of the drive power to the idler mechanism. The left and right moving IDLER GEAR assembly is automatically rotated to the left and the right according to the direction of capstan motor rotation by using the friction force. Because the mechanism is so designed as to drive the reel table of the side on which the tape is transported by the capstan and pinch roller, the forward and reverse constant speed drive (the PLAY, REC, F/R SEARCH modes) is carried out in the state in which the FRICTION MECHANISM is being operated (Fig. 2-12 ⓐ) On the other hand, in the condition in which the friction mechanism is not in operation, the forward/reverse high speed drive (FF/REW mode) is made possible (Fig. 2-12 ⓑ). Also, the reel drive in all modes is taken care of by the single left and right moving idler for design simplification.

The idler body employs gear drive to improve reliability with a view to realizing parts thinning while securing the transmission reliability. Using a resin molded gear as material of an idler, the efficiency of the entire reel drive system has been improved because there are no deformation and loss, and minimized rotation moving torque necessary for biting-in as in the case of a material such as rubber which shows considerable elastic deformation, etc. Further in this mechanism, an intermediate gear is provided in between the reel side and the idler to minimize the rotating and moving angle of the left and right moving idlers, thereby holding the reversing time to a minimum when shifting to the tape running direction change mode. This results in significantly reduced possibility of tape looseness.


(a) PLAY, REC, F/R-SEARCH MODE

(a) The clutch mechanism is disengaged, and rorational force is transmitted through the friction mechanism. (Constant speed rotating mode)

(b) Direct transmission is obtained by disengaging the friction mechanism with a clutch mechanism. (High-speed rotating mode)

(b) F-FWD/REW, STOP MODE

Fig. 2-12 REEL TABLE DRIVE (SIDE VIEW)

2-3-2. Reel Table Drive Clutch Lock and Release Mechanism

As described in the preceding section, using the selection of the step gear (CLUTCH MECHANISM), two mechanisms which are driven by being selected via direct drive or via FRICTION MECHANISM from the capstan motor, to execute the reel table drive. The operating status of the clutch lock and the releasing mechanism is shown in Fig. 2-13.

Fig. 2-13 ① shows the tape unloading position (INITIAL position) when the power for the mechanism operating mode is switched off.

At that times all the levers are in the initial positions, and the clutch is released also so that a route for reel table drive is created via a friction mechanism.

Fig. 2-13 ② shows that the mechanism operation mode has executed the tape loading and that it has completed its movement to the STOP (stand-by), FF/REW position.

At this time, the CLUTCH ACT LEVER is operated by the hook of the ACT BRAKE SLIDE to move the ACT CLUTCH LEVER in the direction of arrow via the CLUTCH LEVER and the CLUTCH CHANGE LEVER. Now, the up and down STEP GEAR is placed into the direct coupled state. In the FF/REW mode, the reel table is directly driven so that the rotation of the capstan motor is directly transmitted to make high-speed rotation drive possible. When shifting the mode to the STOP from the FF/REW in this condition, the mechanism mode position is once moved back to the brake position, and when the reel table brake is instantaneously applied, the clutch is released once at the same time, after which it returns to the same mechanism mode as the FF/REW mode once again. Now, it is placed in a waiting state in the same condition of the STOP mode as shown in Fig. 2-13 ②.

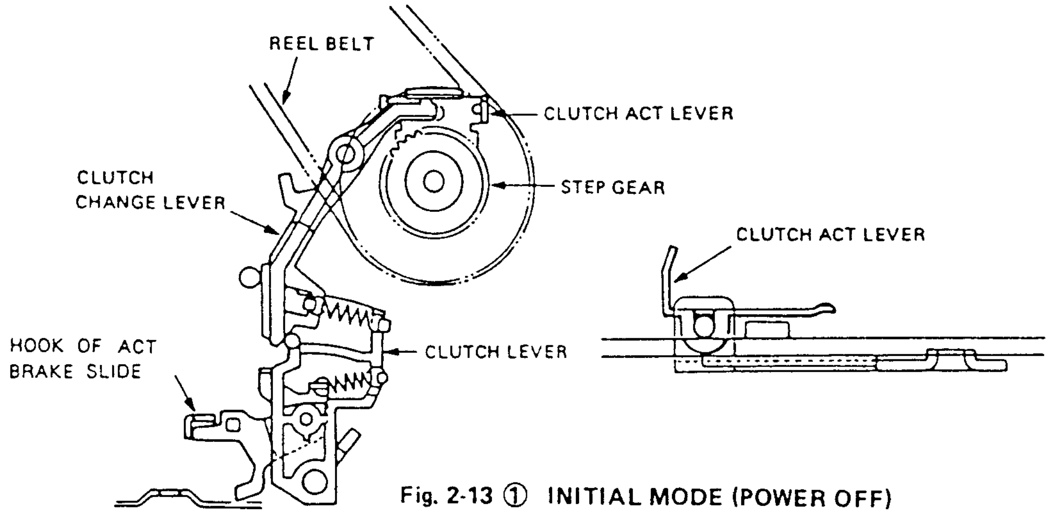
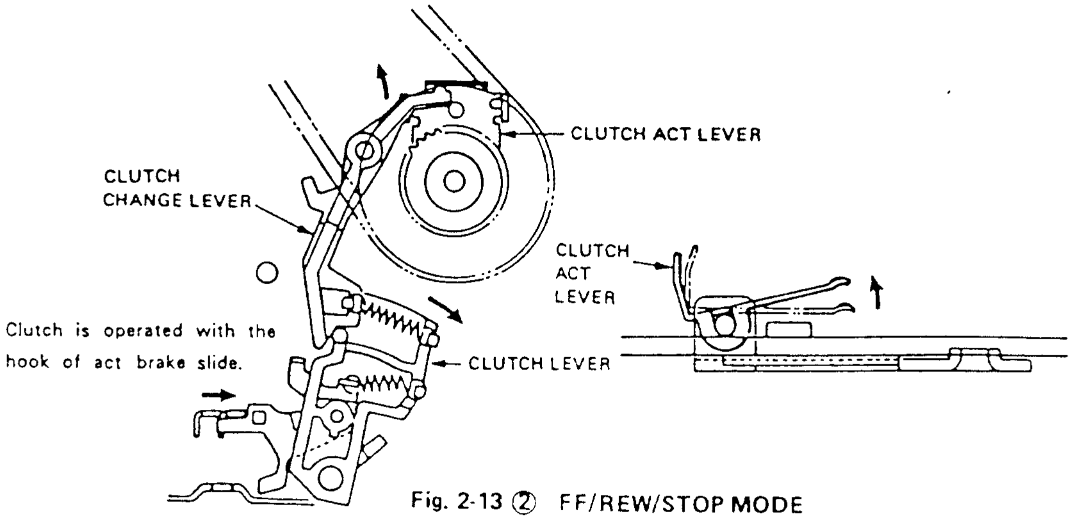


Fig. 2-13 ① INITIAL MODE (POWER OFF)



Clutch is operated with the hook of act brake slide.

Fig. 2-13 ② FF/REW/STOP MODE

Fig. 2-13 ① – ③ REEL TABLE DRIVE CLUTCH LOCK AND RELEASE MECHANISM

Fig. 2-13 ③ shows the completion state of a shift to the PLAY mode via the STILL mode from the STOP (FF/REW) mode for the mechanism mode position.
In the case of this mode shifting, the movement of the BRAKE ACT SLIDE remains fixed. So, the CLUTCH ACT LEVER should be unlocked by the movement of the hook of the MAIN SLIDE PLATE to cause the clutch to be released. This movement in turn causes the capstan motor rotation to be transmitted via the friction mechanism. So, the constant speed rotation drive necessary for the PLAY (REC) mode and SEARCH mode is made possible.

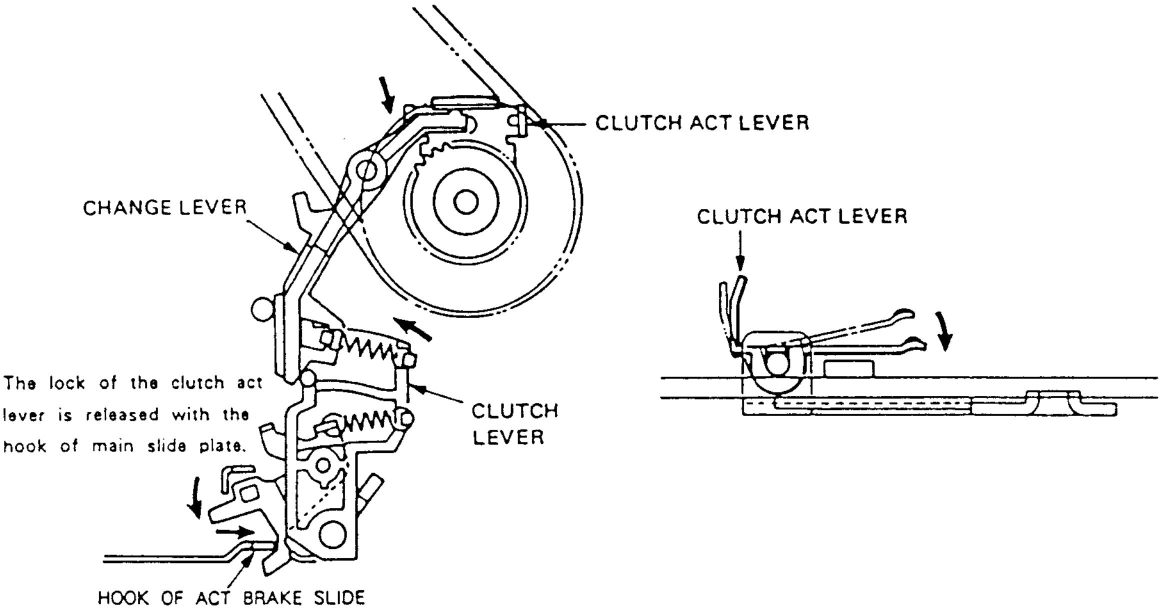

CLUTCH ACT LEVER
CHANGE LEVER
CLUTCH ACT LEVER
The lock of the clutch act lever is released with the hook of main slide plate.
CLUTCH LEVER
HOOK OF ACT BRAKE SLIDE

Fig. 2-13 ③ FF/REW/STOP MODE → STILL MODE → PLAY MODE

2-4. FRONT LOADING DRIVE SELECTION MECHANISM

In the P-88 mechanism, the motor dedicated to the use of front loading is not employed. The drive source is utilized instead of the tape loading motor. As shown in Fig. 2-14 ⓐ/ⓑ, during the front loading the FRONT LOAD WORM GEAR directly coupled to the tape loading motor axle and the FRONT HELICAL GEAR with several teeth missing are engaged with each other and rotated for transmission of the drive force to the front loading mechanism. When the cassette tape is inserted completely in the mechanism, the FRONT HELICAL GEAR is automatically disengaged from the FRONT LOAD WORM GEAR. After that, the tape loading operation is performed without the tape loading motor drive force being transmitted to the front loading mechanism.

While the drive force is being transmitted to the front loading mechanism, the CAM GROOVEs of the before-mentioned MAIN CAM GEAR and the MODE CAM GEAR are flat in cam line pattern. These are therefore held without changing the mode state of the mechanism in any way.

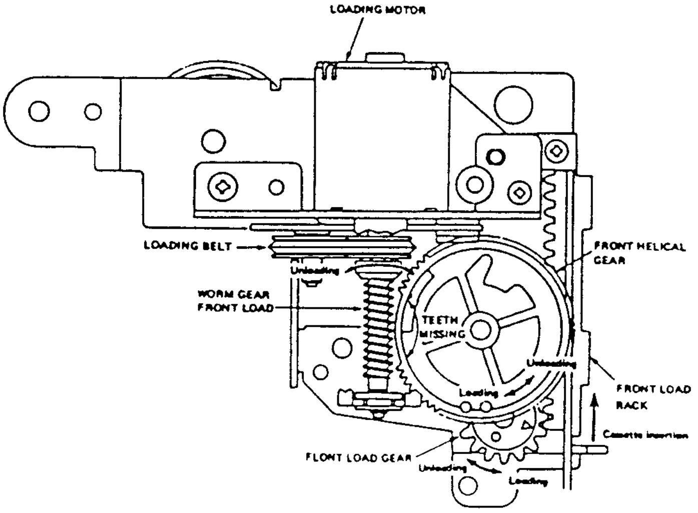

LOADING MOTOR
LOADING BELT
Unloading
WORM GEAR
FRONT LOAD
TEETH
MISSING
FRONT HELICAL
GEAR
Unloading
Loading
FRONT LOAD
RACK
Cassette insertion
FLONT LOAD GEAR
Unloading
Loading

Fig. 2-14 ⓐ FRONT LOADING DRIVE SELECTION MECHANISM (CASSETTE INSERTED POSITION)

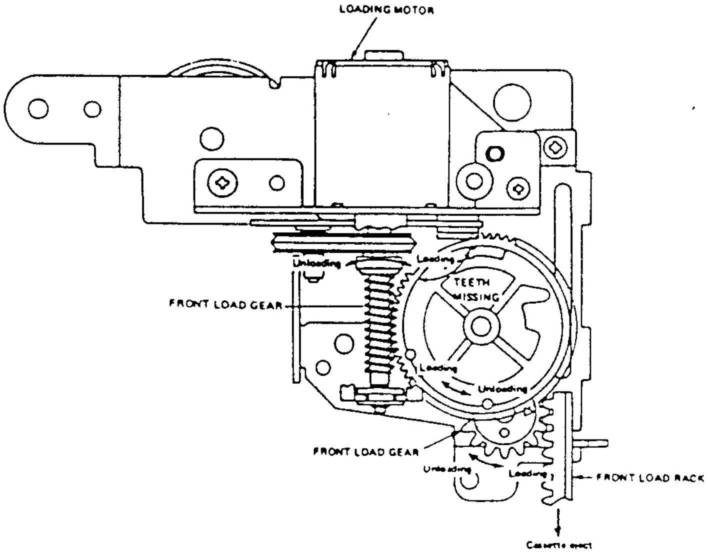

LOADING MOTOR
Unloading
Loading
TEETH
MISSING
FRONT LOAD GEAR
Loading
Unloading
FRONT LOAD GEAR
Unloading
Loading
FRONT LOAD RACK
Cassette eject

Fig. 2-14 ⓑ FRONT LOADING DRIVE SELECTION MECHANISM (CASSETTE EJECTED POSITION)

(A) Cassette inserting operation

When inserting a cassette from the cassette ejected state of Fig. 2-14 ⓑ, the FL START SWITCH shown in Fig. 2-15 is turned OFF, to cause the loading motor to be rotated in the direction of insetting. As a result, the FRONT LOAD RACK is drawn in, and the front loading is made up to the cassette tape completion point. So, it is locked in the grooves shown in Fig. 2-15 to complete cassette inserting. At that time, the FRONT HELICAL GEAR is positioned at ⓐ of Fig. 2-14, and is released from the front loading mechanism, therefore, the tape loading operation is continuously performed.

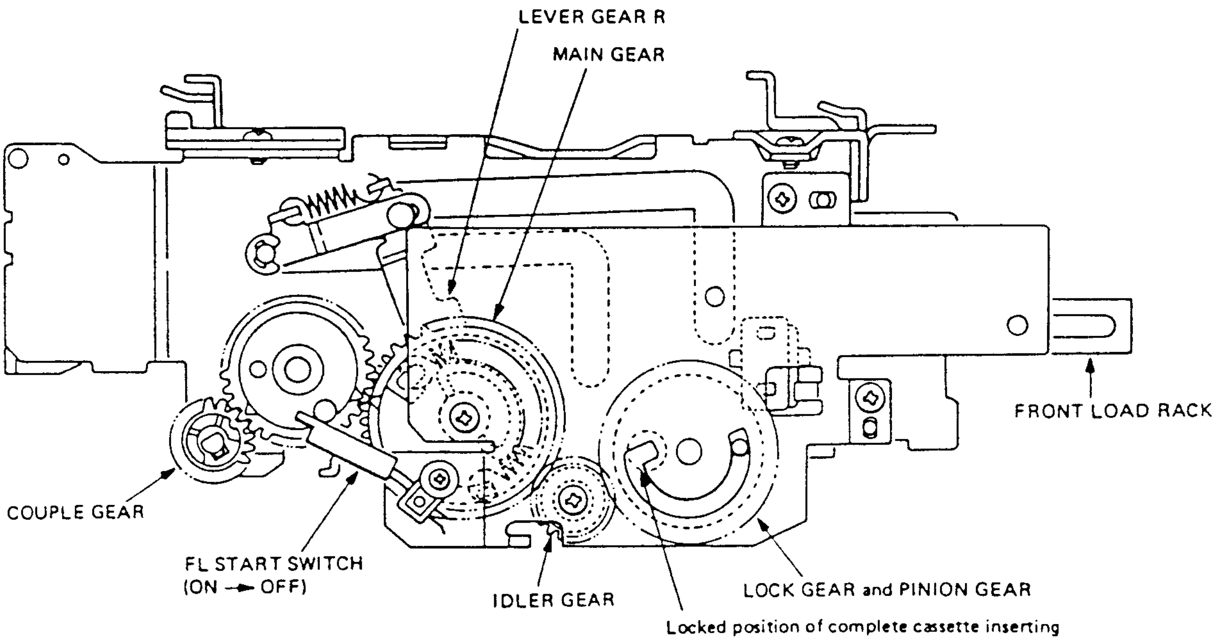

LEVER GEAR R
MAIN GEAR
FRONT LOAD RACK
COUPLE GEAR
FL START SWITCH
(ON → OFF)
IDLER GEAR
LOCK GEAR and PINION GEAR
Locked position of complete cassette inserting

Fig. 2-15 CASSETTE HOLDER MECHANISM (CASSETTE INSERTING OPERATION)

(B) Cassette ejection operation

The components of the front loading mechanism is shown in Fig. 2-16.

When ejecting the cassette from the inserted state shown in Fig. 2-14 ⓐ, the FRONT ACT LEVER is pushed in the direction of arrow due to the ACT SLIDE PLATE moves in the direction of arrow shown in Fig. 2-17. As a result, the FRONT LEVER assembly is turned counterclockwise via the FRONT LOAD SLIDE to cause the FRONT HELICAL GEAR to be engaged with the FRONT LOAD WORM GEAR of the loading motor. At that time, the loading motor is being rotated counterclockwise, so that the FRONT HELICAL GEAR is caused to be rotated counterclockwise also to carry out the front unloading via the FRONT LOAD GEAR and the FRONT LOAD RACK. At the same time, the FRONT ACT LEVER is operated counterclockwise by the hook of the FRONT HELICAL GEAR. This releases the lock being pushed in the direction of arrow indicated by the ACT SLIDE PLATE. So, the FRONT LOAD SLIDE assembly now moves to the initial position to prepare for the next ejection operation. Incidentally, the movement of the FRONT LEVER assembly performs an important function of positioning the FRONT HELICAL GEAR (Fig. 2-14 ⓐ) upon completion of cassette mounting, in addition to the cassette eject start-up operation.

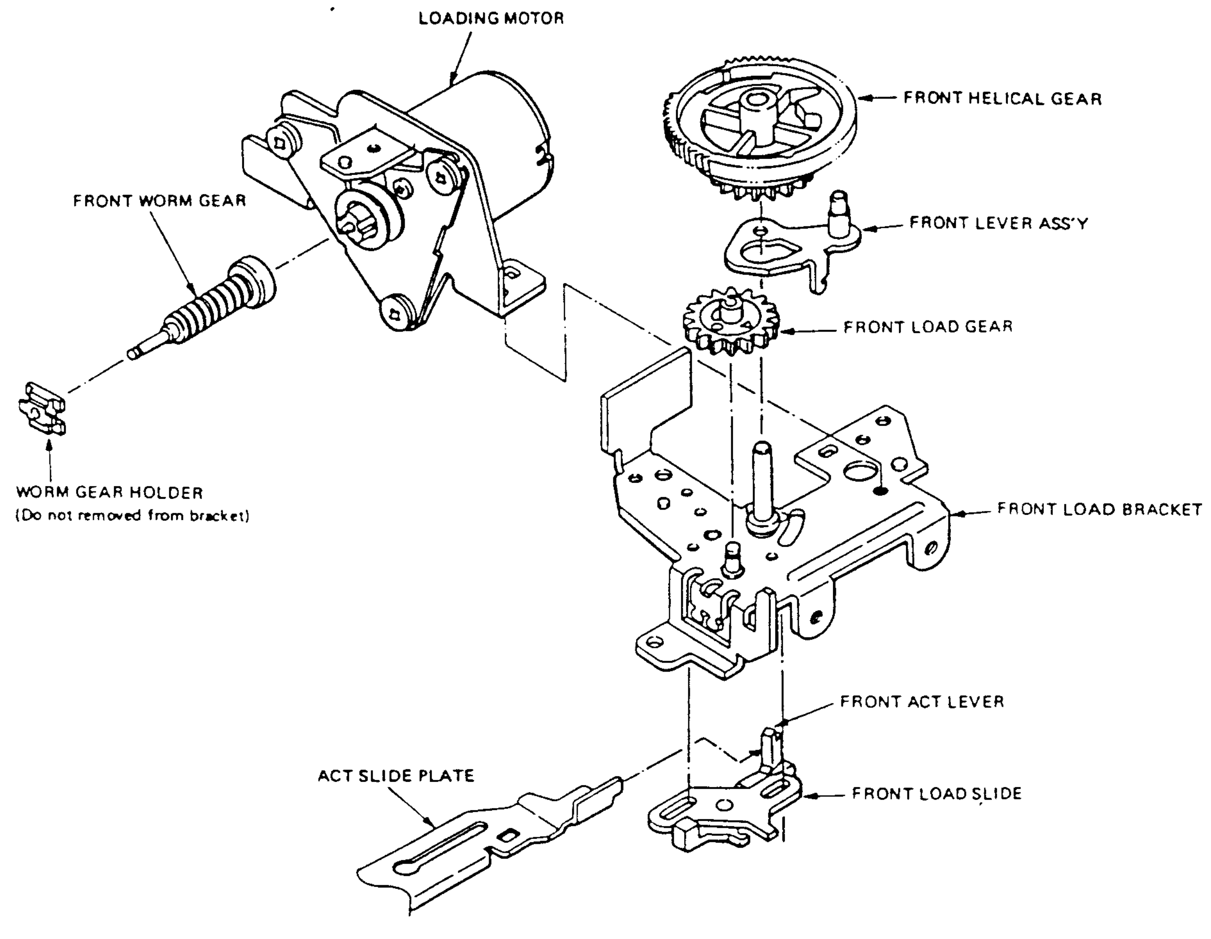
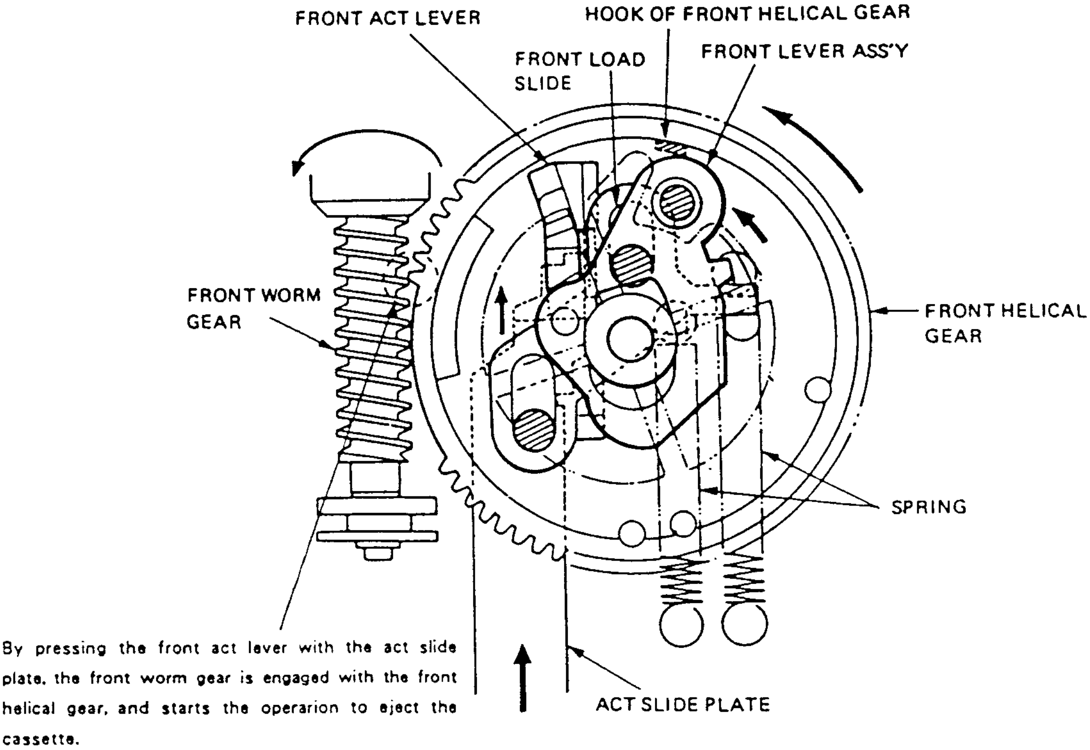

LOADING MOTOR
FRONT HELICAL GEAR
FRONT WORM GEAR
FRONT LEVER ASS'Y
FRONT LOAD GEAR
WORM GEAR HOLDER
(Do not removed from bracket)
FRONT LOAD BRACKET
FRONT ACT LEVER
ACT SLIDE PLATE
FRONT LOAD SLIDE

Fig. 2-16 FRONT LOADING DRIVE SELECTION MECHANISM


FRONT ACT LEVER
HOOK OF FRONT HELICAL GEAR
FRONT LOAD SLIDE
FRONT LEVER ASS'Y
FRONT WORM GEAR
FRONT HELICAL GEAR
SPRING
ACT SLIDE PLATE

By pressing the front act lever with the act slide plate, the front worm gear is engaged with the front helical gear, and starts the operarion to eject the cassette.

Fig. 2-17 CASSETTE EJECTION START OPERATION (See through top view)

2-5. CASSETTE HOLDER MECHANISM

2-5-1. Components

The exploded view of the cassette holder mechanism is shown in Fig. 2-18. This mechanism consists of a cassette tray for feeding the cassette tape to the specified position of the mechanism chassis, a side plate provided with L type holes for supporting and guiding it, the top plate for regulating the width of left and right, and a group of gears for driving the cassette tray.

The entire mechanism is of independent construction apart from the mechanism body. The holder is fixed on the mechanism chassis by inserting the pawls at two points and tightening the setscrews at two points, or at a total of four points.

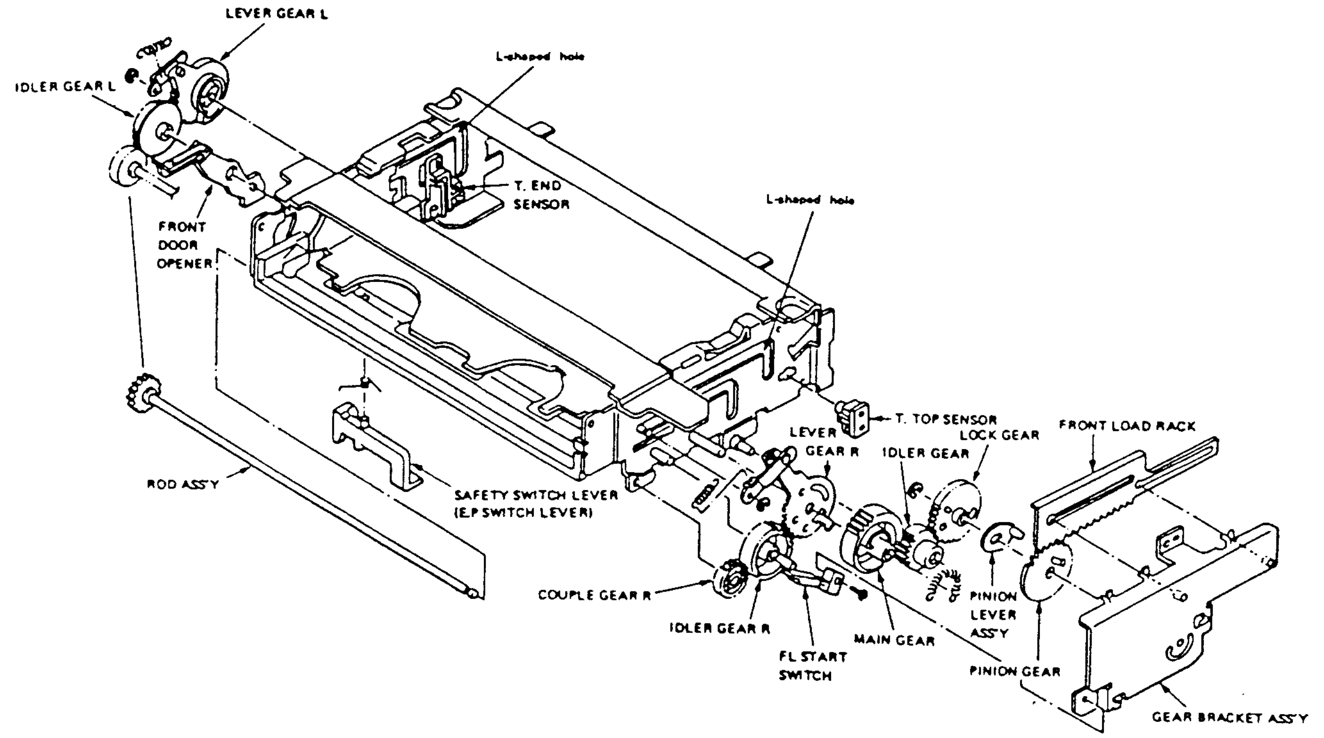

LEVER GEAR L
IDLER GEAR L
L-shaped hole
T. END SENSOR
L-shaped hole
FRONT DOOR OPENER
ROD ASS'Y
SAFETY SWITCH LEVER (E.P SWITCH LEVER)
COUPLE GEAR R
IDLER GEAR R
FL START SWITCH
MAIN GEAR
LEVER
GEAR R
T. TOP SENSOR
LOCK GEAR
IDLER GEAR
FRONT LOAD RACK
PINION LEVER ASS'Y
PINION GEAR
GEAR BRACKET ASS'Y

Fig. 2-18 EXPLODED VIEW OF THE CASSETTE HOLDER MECHANISM

2-5-2. Description of Cassette Holder

The cassette holder is of motor-less design, as the lowering of mechanism height and driving source are done by the loading motor of the mechanism body.

As a substitute for the worm gear system hitherto used in the major drive section for the drive selection mechanism mentioned in section 2-4., the RACK LOADING system is adopted in this cassette holder mechanism. By this mechanism the motor-less design can be realized. An exploded view of the mechanism is shown in Fig. 2-19. A description of the operation is made below along with Fig. 2-19. To press-fit the cassette tape after sending it onto the mechanism chassis, the PINION GEAR section is triple construction. The FRONT LOAD RACK side and the IDLER GEAR side are independently engaged. The PINION GEAR and the LOCK GEAR are connected from the PINION LEVER PIN riveted to the PINION LEVER. Even after feeding the cassette tape to the specified position of the mechanism chassis, the FRONT LOAD RACK slides, giving the rotation to the PINION GEAR which is engaged with the FRONT LOAD RACK. At that time, a pin is dropped into the groove section provided on the GEAR BRACKET ASS'Y.

The other LOCK GEAR is fixed by this PINION LEVER PIN, and the cassette tape is press-fitted onto the mechanism chassis by linked IDLER GEAR. The before-mentioned FRONT LOAD RACK and the PINION GEAR are set free after dropping the PINION LEVER PIN into the groove section. So, the drive force of the loading motor is sent to the mechanism body.

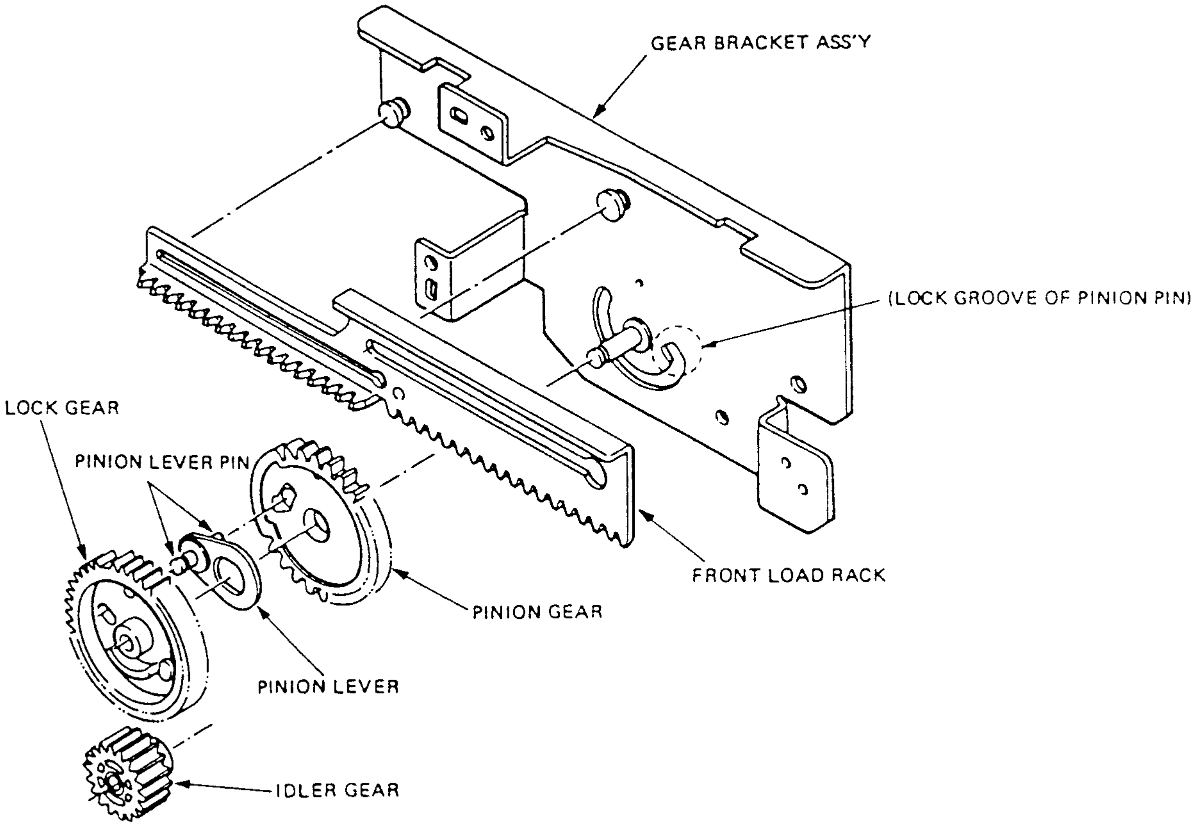


Fig. 2-19 RACK LOADING MECHANISM OF CASSETTE HOLDER

3. MECHANISM CONTROL

3-1. MODE ARRANGEMENT

This mechanism is arranged in such a mode layout as shown in Table. 3-1 and as described in section 2-1. The mode sensing switch described below is used for control of these modes.

3-2. MODE DETECTION SWITCH

For mode detecting two leaf switches (FL START SWITCH and FL END SWITCH), and one rotary switch (MECHANISM MODE SWITCH) are used in combination.

Mechanism Mode	Mechanism Mode Switch			HEX DATA	Function	Main Mode Shifting Conditions	VTR Operation Mode
	3	2	1				
EJECT	–	–	–		Eject position		EJECT
					Front loading/Unloading		
SHORT REW	–	–	–		Take up operation in the tape end position		Detected by FL END switch
INITIAL	1	1	1	⑦	Power off position		Power off when tape is loaded completely
					Tape unloading position Tape loading Tape loading ending position		
BRAKE	0	0	1	①	Main brake applying position		
STOP / FF/REW	0	1	0	②	STOP waiting and FF/REW (the head motor rotation)		STOP, FF/REW
STILL	0	1	1	③	The positions of STILL, SLOW or F-ADV.		STILL, SLOW, F-ADV
PLAY	1	0	0	④	From FWD direction Normal running mode		PLAY, REC, F-SEARCH
IDLER	1	0	1	⑤	Forward/reverse changeover position		PAUSE
REV	1	1	0	⑥	From REV direction Normal running mode		R-SERACH

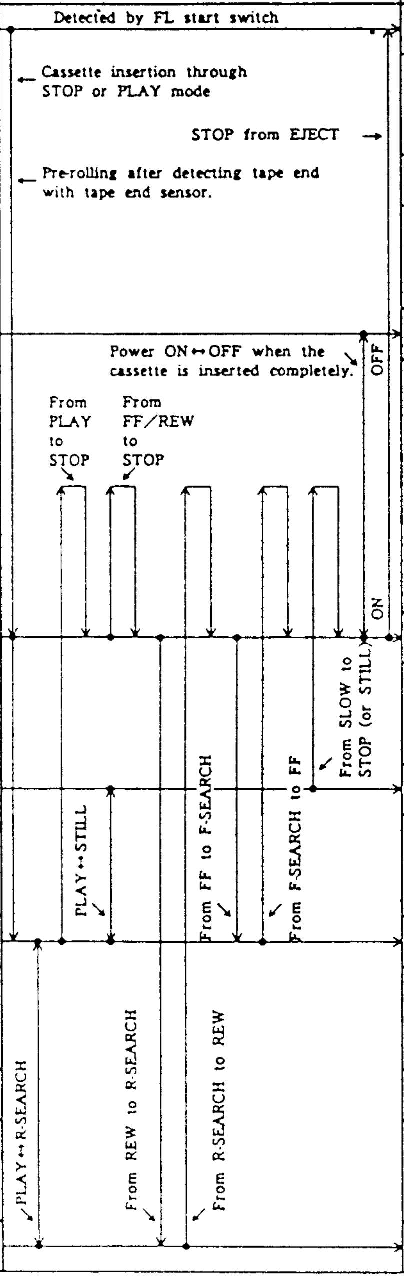

Detected by FL start switch
Cassette insertion through STOP or PLAY mode
STOP from EJECT
Pre-rolling after detecting tape end with tape end sensor.
Power ON↔OFF when the cassette is inserted completely.
OFF
From PLAY to STOP
From FF/REW to STOP
ON
From SLOW to STOP (or STILL)
PLAY↔STILL
From FF to F-SEARCH
From F-SEARCH to FF
PLAY↔R-SEARCH
From REW to R-SEARCH
From R-SEARCH to REW

Table 3-1

(1) Switch component
The mode switch consists of FL START SWITCH for detecting the cassette ejection and insertion, FL END SWITCH for detecting the cassette complete insertion position, that is short rewind position, and MECHANISM MODE SWITCH for detecting the each mode position of the mechanism. As can be understood from Fig. 3-1, the MECHANISM MODE SWITCH rotates in excess of 360 degrees. Therefore, the sensing of a signal from the MECHANISM MODE SWITCH is done by the leaf switch 2.

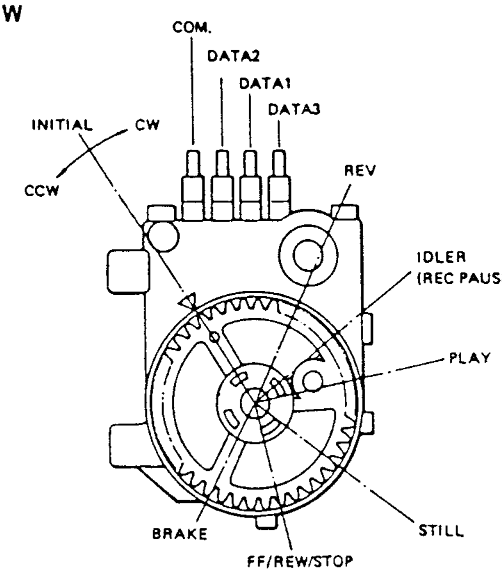
(2) Mechanism mode switch
The mechanism mode switch consists of four terminals, namely, COM, DATA1, DATA2, and DATA3. These are processed as 3-bit signals for discrimination of seven modes.

3-3. CONSIDERATION TO FULL LOADING

① In the normal stop condition, the head drum is rotated to facilitate the start-up of the image at the time of playback, but it is conceivable that this is left undisturbed for an extended period of time. This may result in wear of the video head. For this reason, when five minutes elapse from the stop condition, the head drum stops rotating.

② To prevent the tape from being caught in the head drum due to dew forming, etc., the tape is housed in the unloaded cassette when turning the power off.

A. EXPLODED VIEW


COM.
DATA2
DATA1
DATA3
INITIAL
CW
CCW
REV
IDLER (REC PAUSE)
PLAY
BRAKE
STILL
FF/REW/STOP

B. CONSTRUCTION OF INSIDE SWITCH

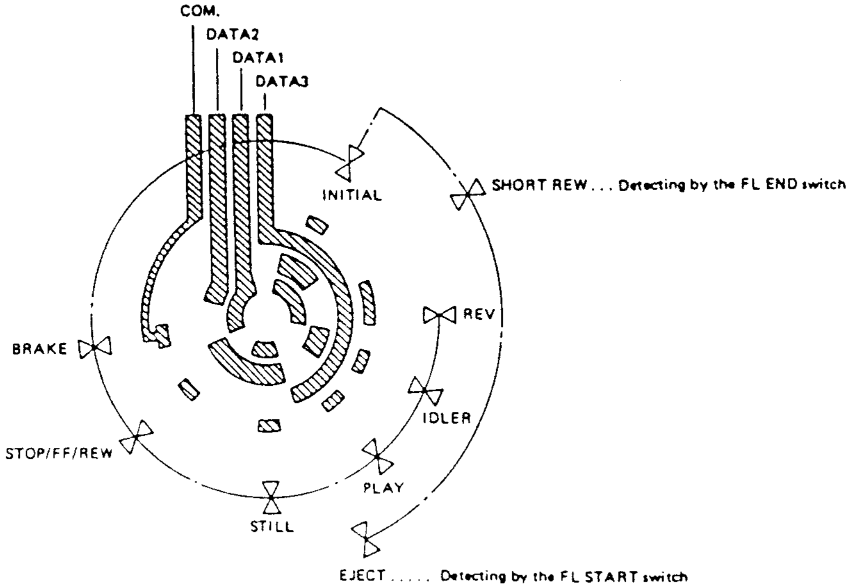

COM.
DATA2
DATA1
DATA3
INITIAL
SHORT REW . . . Detecting by the FL END switch
REV
BRAKE
IDLER
STOP/FF/REW
PLAY
STILL
EJECT . . . . . Detecting by the FL START switch

Fig. 3-1 MECHANISM MODE SWITCH (ROTARY SWITCH)

4. MECHANISM MAINTENANCE AND CHECKING

4-1. PERIODIC CHECKING AND MAINTENANCE ITEMS AND SERVICE JIGS

The following maintenance and periodic checking procedures are recommended to ensure proper operation, and to protect the tape from dirt and damage. Also, these procedures should always be followed after repairing the unit.

4-1-1. Periodic Check Items

○ Cleaning ◎ Confirmation △ Lubrication

Part	Usage Time (hours)	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	Remarks
Tape Guide System	Tape running surfaces	○	○	○	○	○	○	○	○	○	○	
	ACE head	○	○	○	○	○	○	○	○	○	○	
	Drum (cylinder)	○	○	○	○	○	○	○	○	○	○	Head life depends heavily on operating conditions.
Drive System	Loading belt	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	Reel drive belt	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	Intermediate gear, pulley axles		△		△		△		△		△	Absolutely avoid oil on tape running surfaces.
	Capstan axles		△		△		△		△		△	
	Loading motor		◎		◎		◎		◎		◎	
Perfor-mance Check	Back tension torque		◎		◎		◎		◎		◎	42 ± 5gcm
	Brake system		◎		◎		◎		◎		◎	
	FWD, REW, PLAY torque		◎		◎		◎		◎		◎	FWD, REW : 800gcm and over PLAY (SP) : 80 to 150gcm

4-1-2. Cleaning

① Drum (COMPL CYLINDER) and Video Heads (See Fig. 4-1-1.)

1) Wrap a chamois leather around your finger and moisten it with methyl alcohol.
2) Move the chamois leather to left and right several times on the video head to clean. There is a video head also on the opposite side, so clean it likewise. In Hi-Fi models, clean the audio head also.
3) Clean the tape path surface of the cylinder in the same way.

Note : Always turn power off before cleaning. Do never move the chamois leather vertically or apply too much force to the head ; it may be damaged.

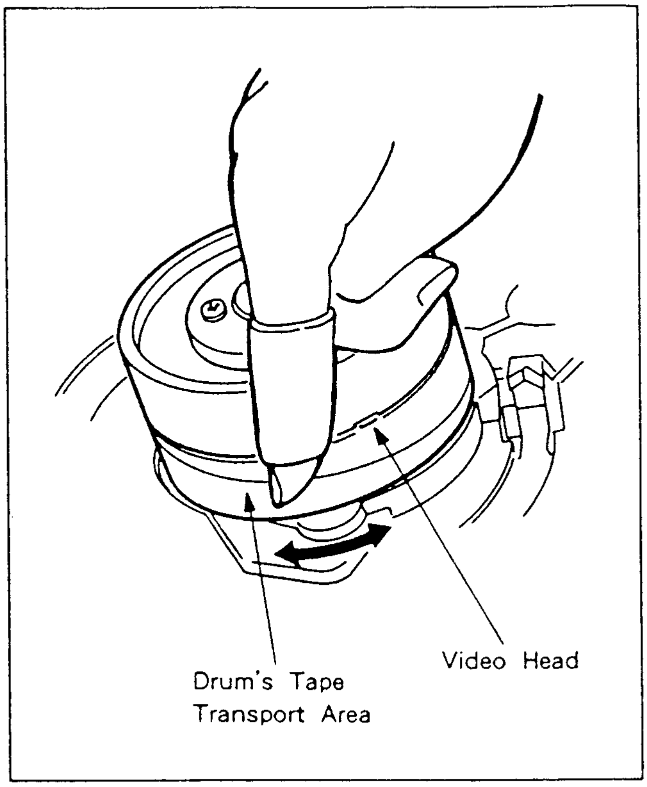

Video Head
Drum's Tape Transport Area

Fig. 4-1-1.

② Cleaning of the Tape Guide System (See Fig. 4-1-2.)

1) Set the EJECT mode and clean the tape guide system (tape guides, impedance roller, FTE head, ACE head, pinch rollers, capstan axles, etc.) with a chamois leather moistened with methyl alcohol.

Note : Make sure that no oil, grease, etc. adhere to the chamois leather and that heads are not damaged.

③ Cleaning of the Drive System

1) Clean the drive system (loading belt, reel drive belt, pulley, supply reel table, etc.) with a soft cloth moistened with methyl alcohol.

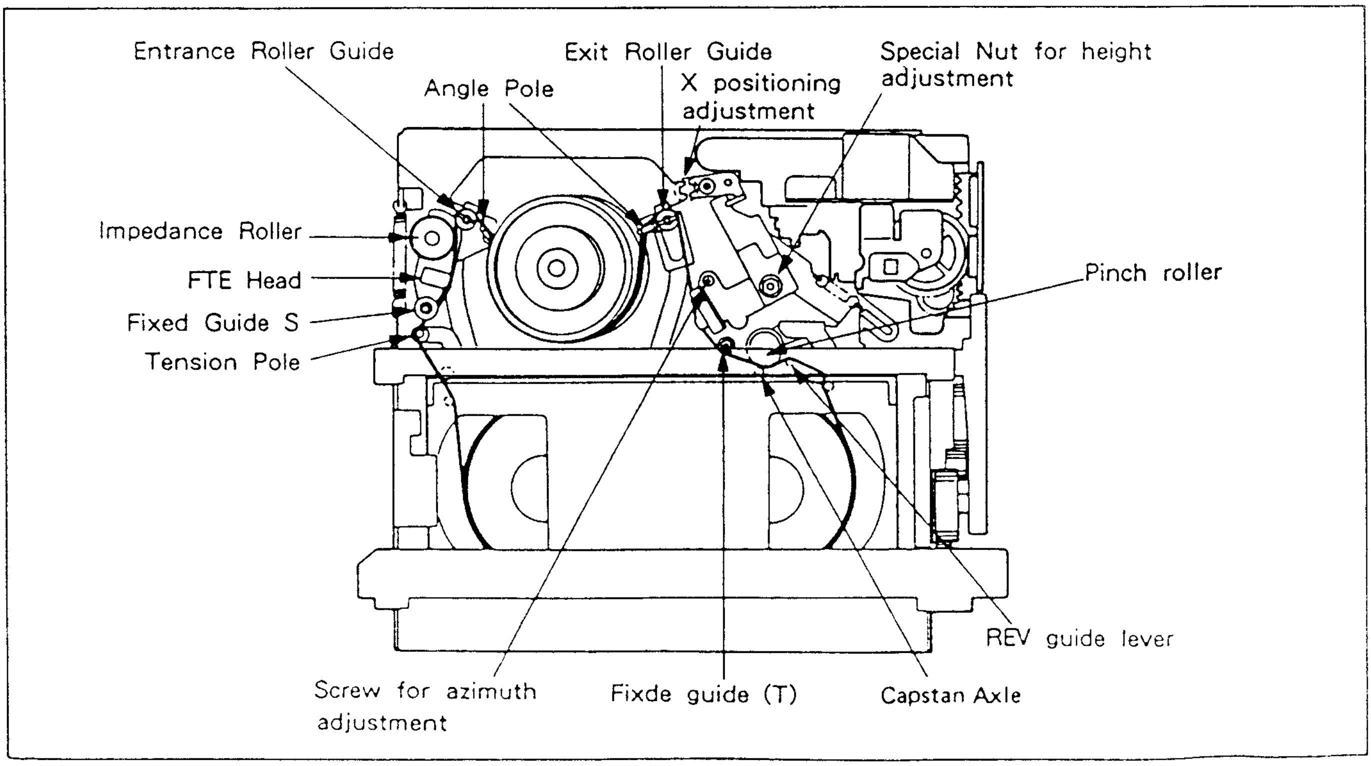
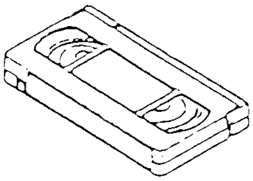

Entrance Roller Guide
Angle Pole
Exit Roller Guide
X positioning adjustment
Special Nut for height adjustment
Impedance Roller
FTE Head
Fixed Guide S
Tension Pole
Pinch roller
REV guide lever
Screw for azimuth adjustment
Fixde guide (T)
Capstan Axle

Fig. 4-1-2. Cleaning

4-1-3. Service Jigs

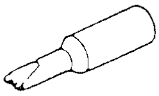
No.	Jig	Jig No.	Remarks
1	Alignment tape	H-7099-175-H	SP monoscope,
2	Eccentric screwdriver (VHJ-0003)	J-6082-044-A	For tape path adjustment
3	Nut box (VHJ-0048)	J-6082-045-A	For tape path adjustment
4	Torque gauge	H-7099-039-H	For reel take-up torque measurement
5	Torque gauge adapter	H-7099-035-H	For reel take-up torque measurement
6	Position adjustment gauge (VHJ-0049)	J-6082-046-A	For position adjustment
7	Torque gauge screwdriver (VHJ-0014)	J-6082-047-A	For screw fastening torque adjustment
8	3mm dia. bit for torque screwdriver (VHJ-0045)	J-6082-048-A	Spare bit for the torque gauge screwdriver
9	Video head removing tool (VHJ-0041)	J-6082-049-A	For upper drum removal
10	Mode selector (VHJ-0050)	J-6082-050-A	For mechanism mode selection
11	Cassette stand plate gauge (VHJ-0001)	J-6082-051-A	For reel height adjustment
12	Fixed guide height gauge (VHJ-0053)	J-6082-052-A	For fixed guide (S) height adjustment
13	Mode selector relay (VHJ-0070)	J-6082-077-A	
14	PAL torque cassette (VHT-063S)	J-6082-066-A	For back tension torque

H-7099-153-H



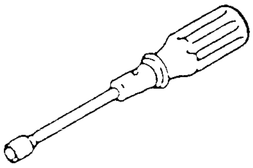
No. 1

J-6082-044-A (VHJ-0003)



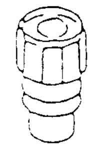
No. 2

J-6082-045-A (VHJ-0048)



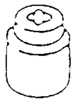
No. 3

H-7099-039-H



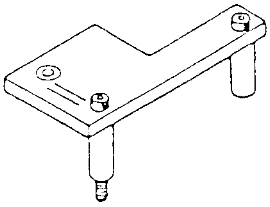
No. 4

H-7099-035-H



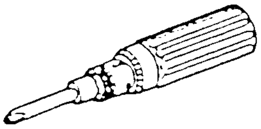
No. 5

J-6082-046-A (VHJ-0049)



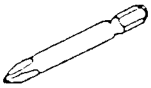
No. 6

J-6082-047-A (VHJ-0014)



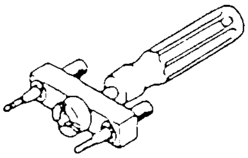
No. 7

J-6082-048-A (VHJ-0045)



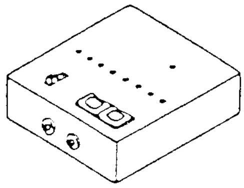
No. 8

J-6082-049-A (VHJ-0041)



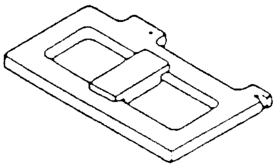
No. 9

J-6082-050-A (VHJ-0050)



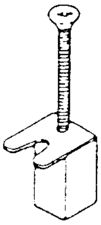
No. 10

J-6082-051-A (VHJ-0001)



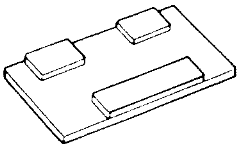
No. 11

J-6082-052-A (VHJ-0053)



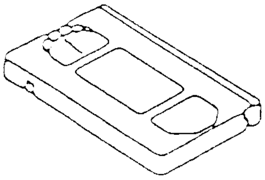
No. 12

J-6082-077-A (VHJ-0070)



No. 13

J-6082-066-A (VHT-0638)



No. 14

4-2. MODE SELECTOR (VHJ-0050) HANDLING INSTRUCTIONS

The mode selector drives the loading motor of the P88 mechanism with its internal batteries (UM-2 × 4 = 6V), using LEDS to indicate the mode (EJECT, INITIAL, BRAKE, STOP/REW/FWD, STILL, PLAY, IDLER, REV) simultaneously with EJECT⇔REV mode changes.
Instead of the internal batteries, an external DC 6V power supply can also be used.

4-2-1. Part Names (See Fig. 4-2-1)

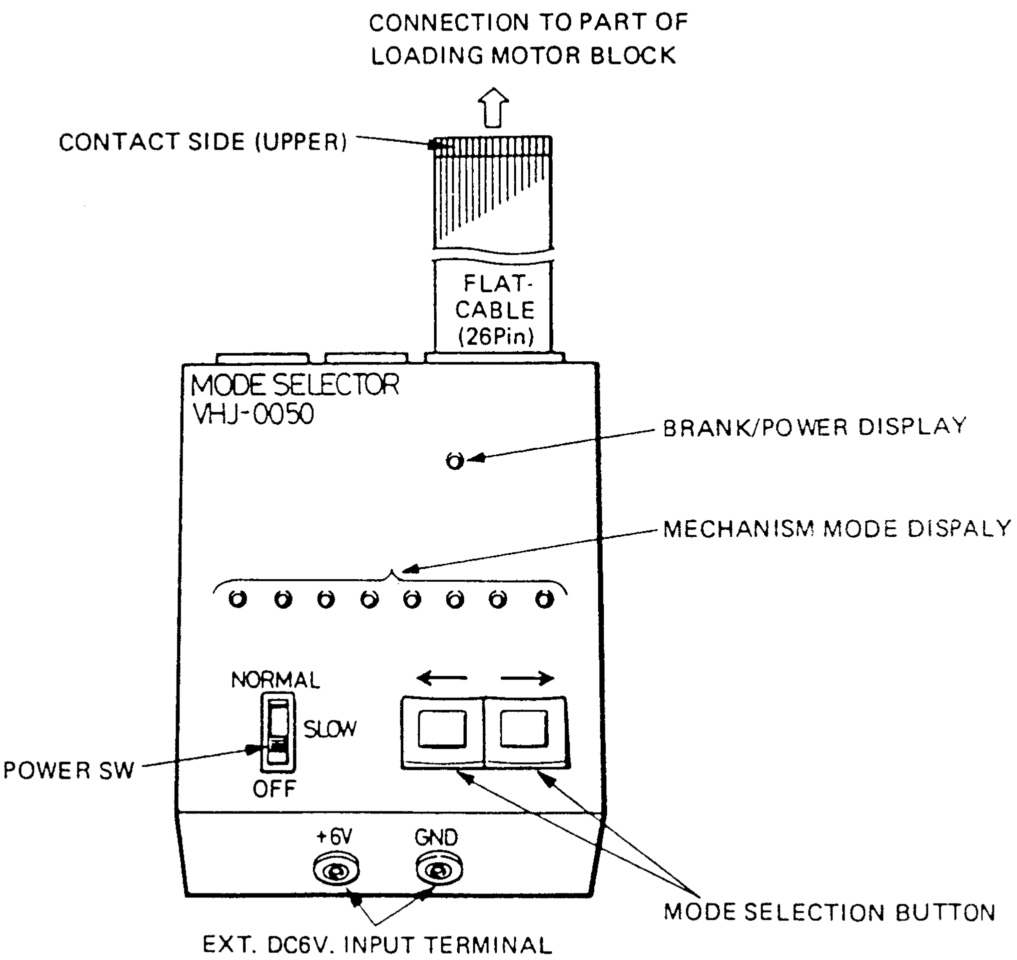

CONNECTION TO PART OF LOADING MOTOR BLOCK
CONTACT SIDE (UPPER)
FLAT-CABLE (26Pin)
MODE SELECTOR VHJ-0050
BRANK/POWER DISPLAY
MECHANISM MODE DISPALY
NORMAL
SLOW
OFF
POWER SW
+6V
GND
MODE SELECTION BUTTON
EXT. DC6V. INPUT TERMINAL

Fig. 4-2-1

4-2-2. Connection Method

1. Connection for Case 1 (See Fig. 4-2-2.)

1) Remove 14-PIN FLAT CABLE from COMPL MC-2 BOARD CONNECTOR (CN817) from the connector of the system control circuit board, and connect it to 14-PIN CONNECTOR of MODE SELECTOR RELAY JIG VHJ-0070.
2) Remove the connector of 6-WIRE CABLE emerging from CASSETTE HOLDER BLOCK from the connector of the system control circuit board, and connect it to 6-PIN CONNECTOR of MODE SELECTOR RELAY JIG VHJ-0070.
3) Connect 26-PIN FLAT CABLE supplied with MODE SELECTOR (VHJ-0050) to the selector and to 26-PIN CONNECTOR of RELAY JIG VHJ-0070.

Note : Be sure to connect the proper contact surface of FLEXIBLE FLAT CABLE.

4-2-3. Handling

1) Keep the right side (⇨) of the mode selector key pressed, and the mode will change in the following sequence: EJECT⇨INITIAL⇨BRAKE⇨STOP/REW/FWD⇨STILL⇨PLAY⇨IDLER⇨REV.
2) When changing the mode in the REV···⇨EJECT direction, press the Left side (⇦) of the mode selector key until the desired mode is indicated.
3) At intermediate positions between modes, the "BLANK" LED lights up (When the mode selector is not connected to the mechanism, the "BLANK" LED indicates that power is on).
4) The SLOW position of the POWER switch allows for a slower operation than the NORMAL position.

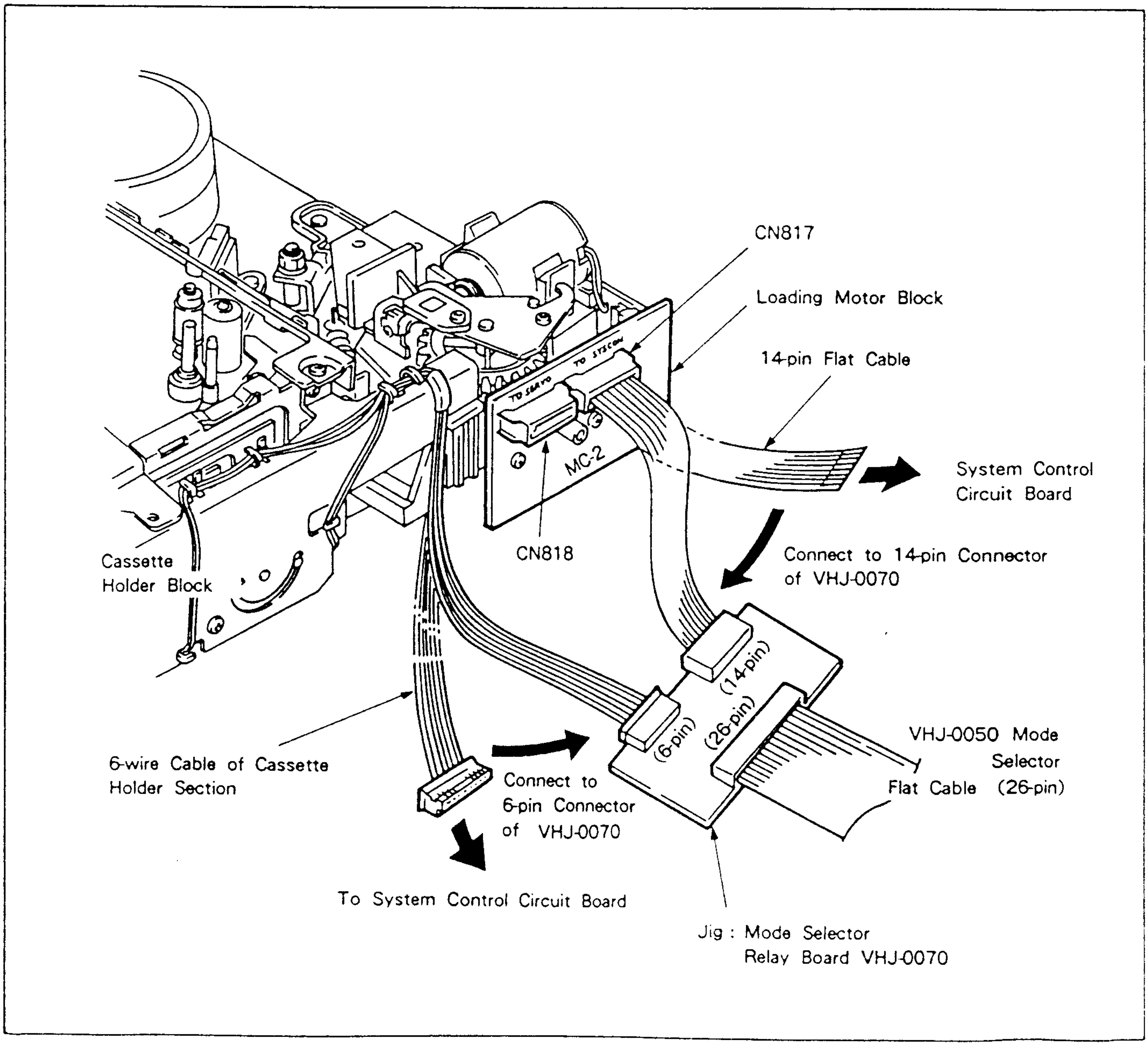

CN817
Loading Motor Block
14-pin Flat Cable
System Control Circuit Board
TO SERVO
TO SYSCON
MC-2
CN818
Connect to 14-pin Connector of VHJ-0070
Cassette Holder Block
(14-pin)
(26-pin)
(6-pin)
VHJ-0050 Mode Selector Flat Cable (26-pin)
6-wire Cable of Cassette Holder Section
Connect to 6-pin Connector of VHJ-0070
To System Control Circuit Board
Jig : Mode Selector Relay Board VHJ-0070

Fig. 4-2-2

Note 1 : The mode selector drives the loading motor only, not affecting the head drum motor and the capstan motor. When using the mode selector with a cassette loaded, turn the capstan motor manually to remove tape slackness, preventing tape entanglement.

Note 2 : If the Left side (⇦) of the mode selector (VHJ-0050) key is kept pressed with the COMPL cassette mechanism removed, it might get past the EJECT position, causing the front helical gear and the front worm gear to get disengaged.

In this condition, since the front helical gear will not turn even if the right side (⇨) of the mode selector key is pressed, rotate (push) the front helical gear clockwise by hand and engage it with the front worm gear. In this condition, as there is a misalignment between the mechanism main body operation mode (indicated by the mode selector indicator lamps) and the front loading mechanism operation mode, keep the right side (⇨) of the mode selector key pressed until the front helical gear and the front loading gear of the front loading mechanism get back to the initial condition (Refer to A and B in Fig. 5-3-5 of section 5-3-2. Loading Motor).

When the front loading mechanism returns to the initial condition, operation mode of the whole mechanism gets back to normal, matching the mode shown by the mode selector indicator lamps (mode is not properly indicated, however, during eject).

Sometimes, engagement of the front helical gear with the front worm gear is delayed, operation mode of the mechanism main body gets too much ahead and the front loading mechanism mode cannot be switched to the initial condition. In that case, press the Left side (⇦) of the mode selector key, setting the mechanism main body operation mode back to EJECT (rotation of the mode cam and the MAIN CAM stops).

Note 3 : The mode selector indicator lamps show the mechanism operation mode, but the EJECT lamp may sometimes fail to indicate the actual mechanism operation mode.

When setting the mechanism to the EJECT or INITIAL mode for dismounting or reassembling, fine adjustment of the each gear and cam, etc., marking positions is required after the mode selector indicator lamp has lighted up. Perform this with the mode selector switch in the SLOW position.

5. MECHANISM DISMANTLING AND REASSEMBLING

5-1. MECHANISM MAIN UNIT (See Fig. 5-1-1.)

1. **Removal**

1) Remove the connectors of the COMPL MC-2, the COMPL MC-3 and the COMPL HEAD BRACKET.
2) Remove the flexible P.C.B. ① connecting the COMPL CYLINDER to the COMPL VP-1 ③ (See Fig. A).
3) Remove the two screws ②, then remove the COMPL VP-1 ③.
4) Remove the screw ④, then remove the PRE-AMP. BRACKET ⑤.
5) Remove the two screws ⑥.
6) Remove the three screws ⑦ and two screws ⑩, then lift up the mechanism main unit and remove it.
   Since the TRAY ⑧ obstructs removal of the two front screws ⑩, move the TRAY LOCK LEVER ⑨ in the direction of the arrow to unlock, then slide the TRAY ⑧ before removing the screws.

Note : Shape of the COMPL VP-1 ③ and the PRE-AMP. BRACKET ⑤ differ depending on the model.

2. **Remounting**

1) Mount the mechanism main unit onto the chassis with the three screws ⑦ and two screws ⑩.
2) Tighten the two screws ⑥.
3) Mount the PRE-AMP. BRACKET ⑤ with the two screws ④.
4) Mount the COMPL VP-1 ③ and the ground lug with the two screws ② (some models are not provided with a ground lug).
5) Insert the flexible P.C.B. ① into the connector of the COMPL VP-1.
6) Connect the connectors of the COMPL MC-2, COMPL MC-3 and COMPL HEAD BRACKET.

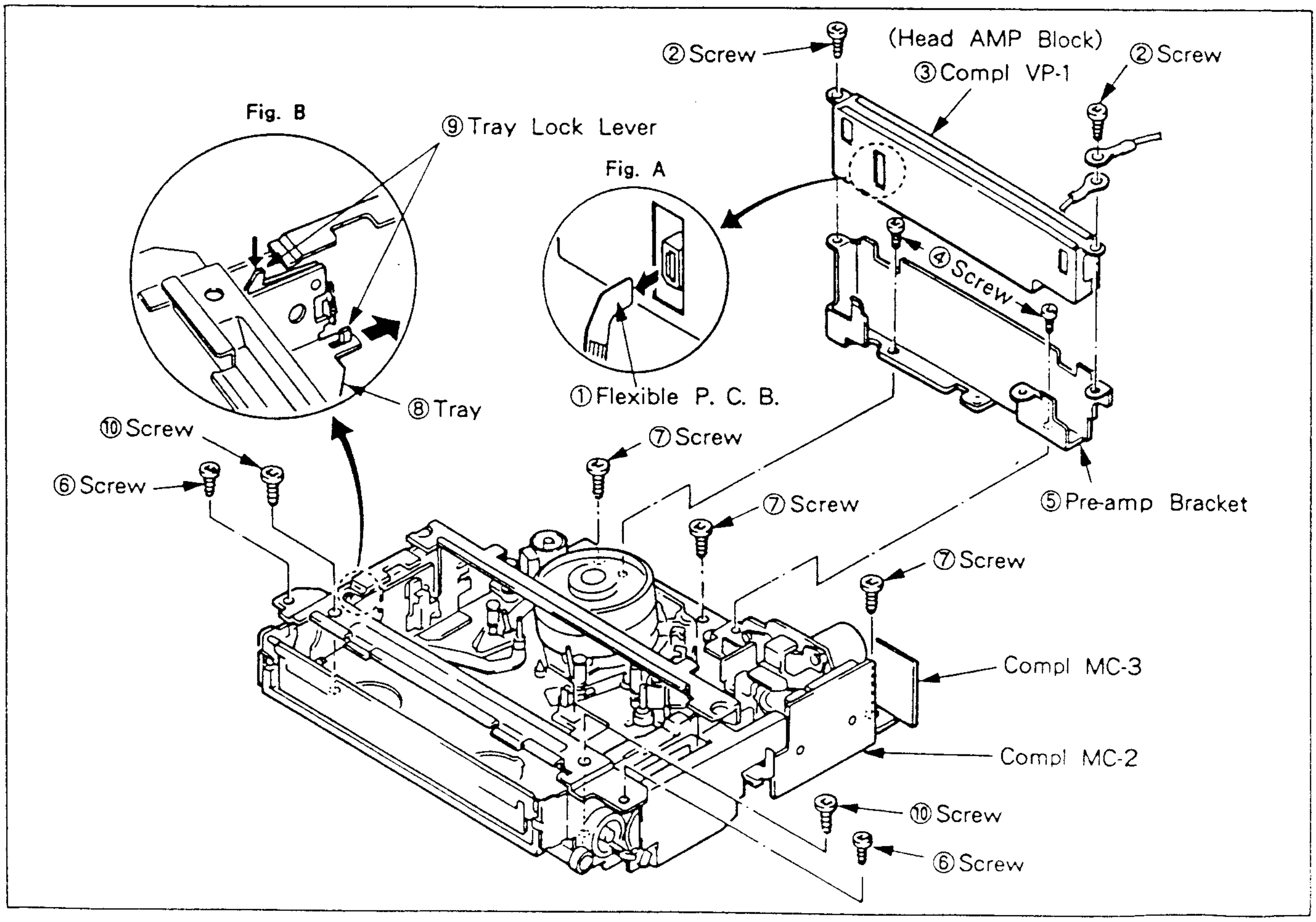

②Screw
(Head AMP Block)
③Compl VP-1
②Screw
Fig. B
⑨Tray Lock Lever
Fig. A
④Screw
①Flexible P. C. B.
⑧Tray
⑩Screw
⑥Screw
⑦Screw
⑦Screw
⑤Pre-amp Bracket
⑦Screw
Compl MC-3
Compl MC-2
⑩Screw
⑥Screw

Fig. 5-1-1 Mecahnism Main Unit

5-2. CASSETTE HOLDER MECHANISM

5-2-1. COMPL Cassette Mechanism (See Fig. 5-2-1.)

1. Removal

1) Set the video main unit to the EJECT completed mode.
2) Pull out the connectors (6-PIN CONNECTOR connected to the system control circuit board, ACE HEAD CONNECTOR, and FTE HEAD CONNECTOR) from CASSETTE HOLDER.
3) Remove the two screws ①.
4) Remove the two screws ②.
5) Lift up the COMPL CASSETTE MECHANISM ④ back a little and remove the two hooks ③ on the front (See Fig. B). When doing so, make sure that the SAFETY SWITCH LEVER is not caught by the mechanism chassis.

2. Remounting

1) Set the chassis section mechanism to the EJECT mode with the mode selector (VHJ-0050) (looking from above, match the front loading gear hole ⑤ with the FRONT BRACKET ASS'Y hole ⑥ as shown in Fig. A).
2) Set the COMPL CASSETTE MECHANISM ④ to the EJECT completed mode.
3) Mount the COMPL CASSETTE MECHANISM ④ onto the mechanism chassis, aligning it with the protuberance.
   Match positions of the FRONT LOADING GEAR △ mark ⑦ and the RACK EJECT mark ⑧. (See Fig. A.)
4) Fix to the mechanism chassis with the two screws ②.
5) Fix to the chassis with the screw ①.
6) Connect to the various connectors.

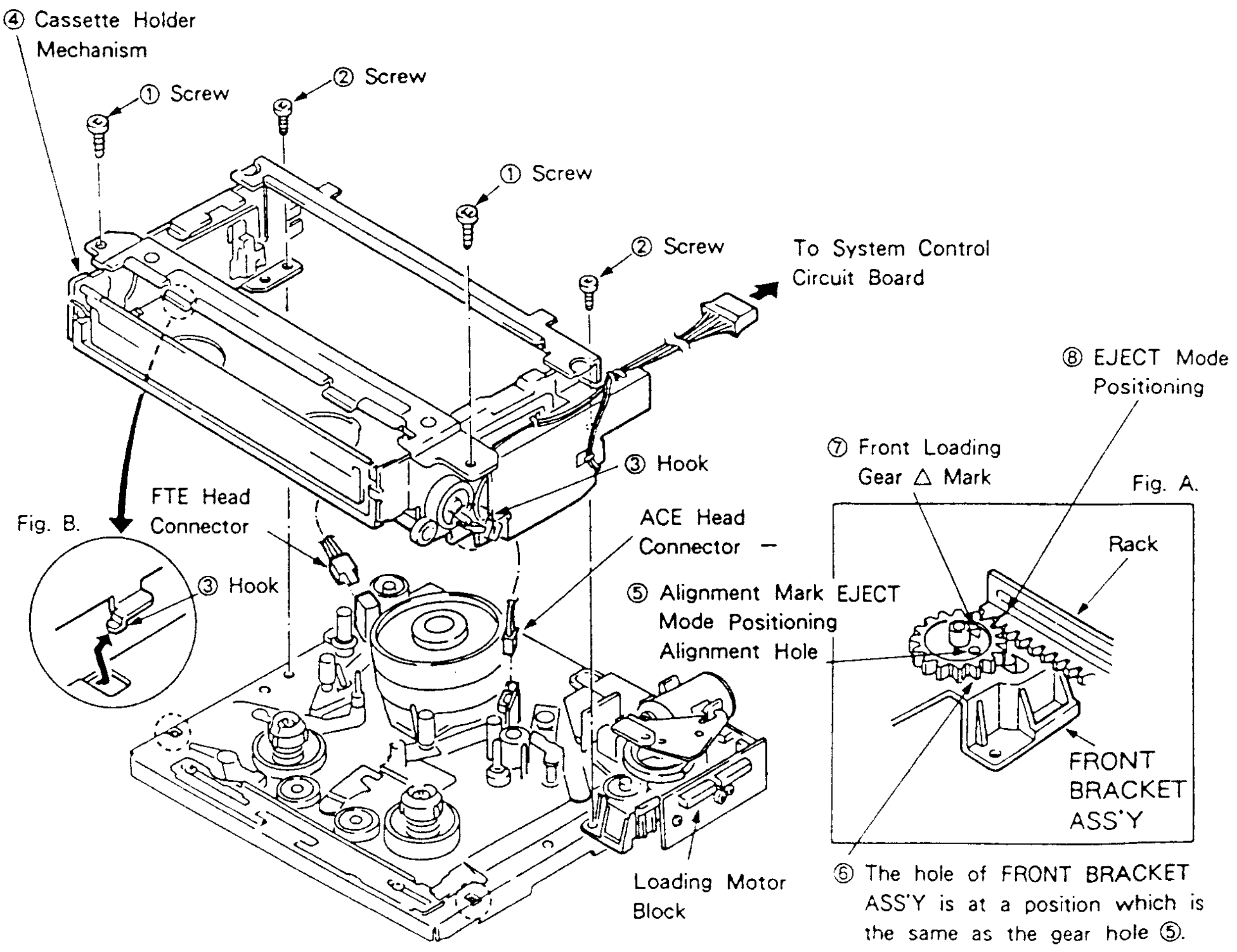

④ Cassette Holder Mechanism
① Screw
② Screw
① Screw
② Screw
To System Control Circuit Board
⑧ EJECT Mode Positioning
③ Hook
⑦ Front Loading Gear △ Mark
Fig. A.
Rack
FTE Head Connector
Fig. B.
③ Hook
ACE Head Connector
⑤ Alignment Mark EJECT Mode Positioning Alignment Hole
FRONT BRACKET ASS'Y
Loading Motor Block
⑥ The hole of FRONT BRACKET ASS'Y is at a position which is the same as the gear hole ⑤.

Fig. 5-2-1 COMPLE Cassette Mechanism

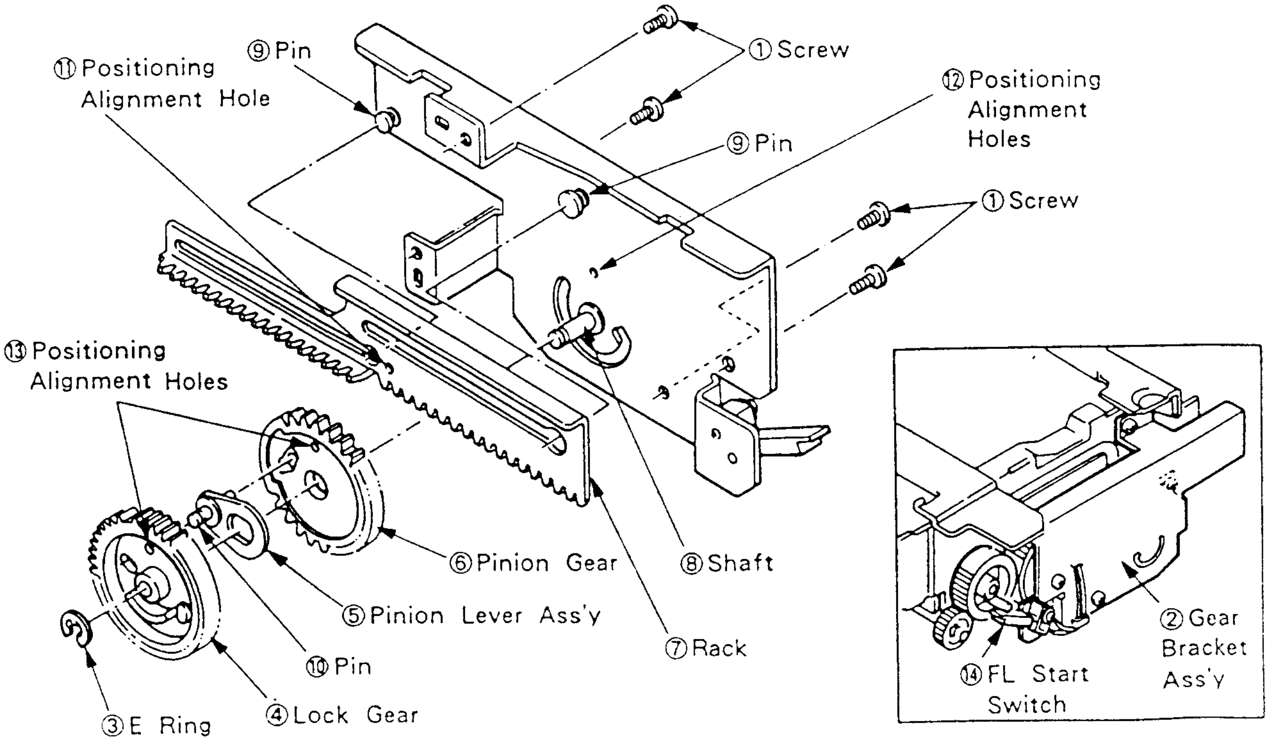
5-2-2. Gear Bracket Ass'y (See Fig. 5-2-2.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the four screws ①, then remove the GEAR BRACKET ASS'Y ②.
3) Remove the E ring ③, then remove the LOCK GEAR ④, the PINION LEVER ASS'Y ⑤, the PINION GEAR ⑥ and the RACK ⑦, in that order.

2. Remounting

1) Apply grease to the shaft ⑧ and the two pins ⑨ of the GEAR BRACKET ASS'Y.
2) Apply grease to the pin ⑩ of the PINION LEVER ASS'Y.
3) Apply grease to the toothed part of the RACK ⑦.
4) Fit the RACK ⑦ onto the two pins ⑨. Match position of the hole ⑪ to the GEAR BRACKET hole ⑫.
5) Mount the PINION GEAR ⑥, the PINION LEVER ASS'Y ⑤ and the LOCK GEAR ④ onto the axle ⑧, in that order.
   Do it so that the PINION GEAR and LOCK GEAR HOLE ⑬ is aligned with the GEAR BRACKET hole ⑫.
6) Mount the E ring onto the axle ⑧.
7) Mount the GEAR BRACKET ASS'Y with the four screws ①, aligning it with the protuberance.
   When doing so, make sure that RACK and GEAR do not get misplaced with regard to each other.
   Also confirm that the FL START SWITCH ⑭ is ON.
8) Remount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.



⑪ Positioning Alignment Hole
⑨ Pin
① Screw
⑫ Positioning Alignment Holes
⑨ Pin
① Screw
⑬ Positioning Alignment Holes
⑥ Pinion Gear
⑧ Shaft
⑤ Pinion Lever Ass'y
⑦ Rack
⑩ Pin
③ E Ring
④ Lock Gear
② Gear Bracket Ass'y
⑭ FL Start Switch

Fig. 5-2-2. Gear Bracket Ass'y

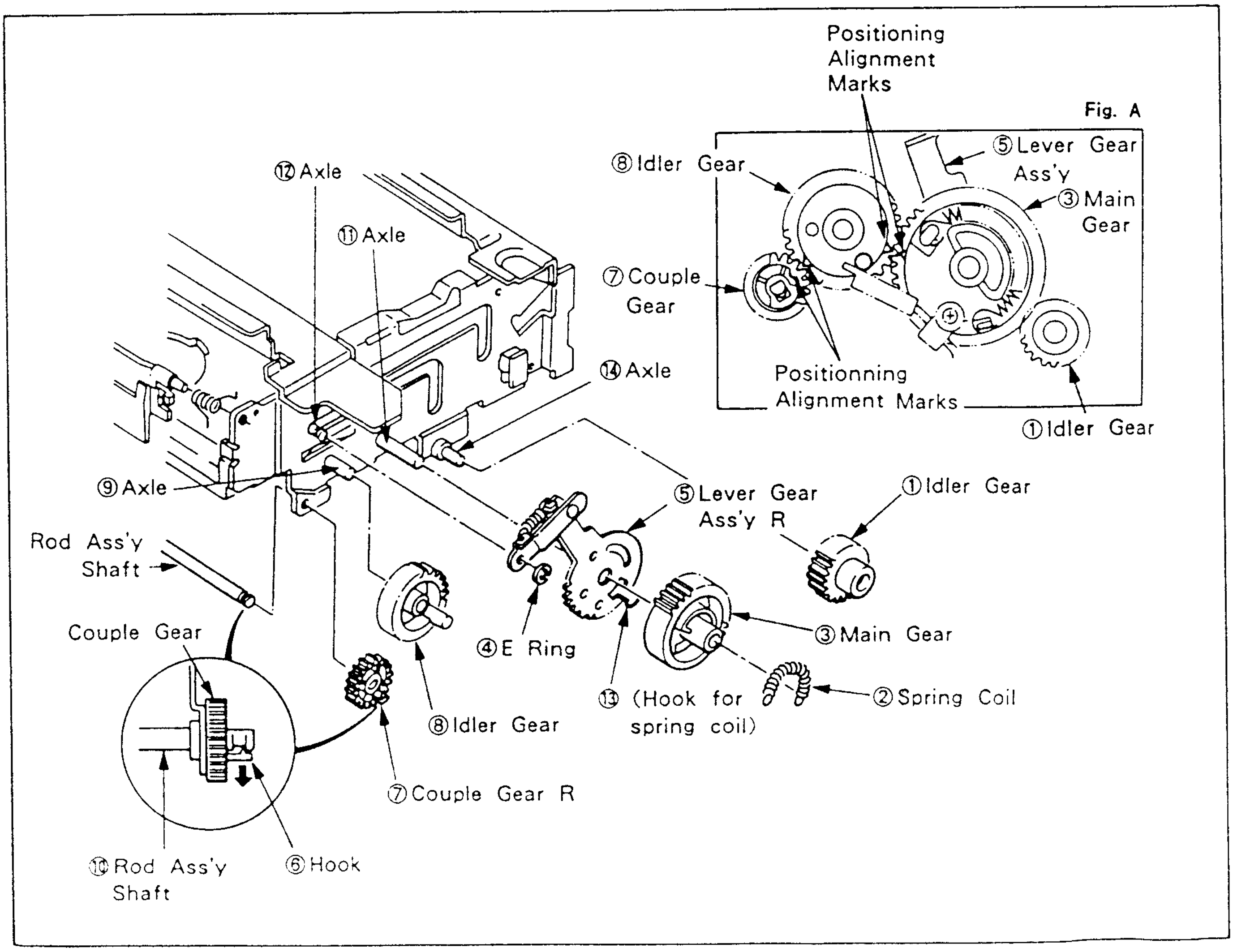
5-2-3. Cassette Drive Gear (Right) (See Fig. 5-2-3.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM and the GEAR BRACKET ASS'Y as instructed in 5-2-1. and 5-2-2., respectively.
2) Remove the IDLER GEAR ①.
3) Remove the SPRING COIL ②, then remove the MAIN GEAR ③.
4) Remove the E ring ④, then remove the LEVER GEAR ASS'Y R ⑤.
5) Open the hook ⑥ and remove the COUPLE GEAR R ⑦. Take care not to open the hook ⑥ too much, otherwise it may get deformed or broken. If it does, replace it.
6) Remove the IDLER GEAR R ⑧.

2. Remounting

1) Apply grease to gear parts that undergo friction.
2) Mount the IDLER GEAR R ⑧ onto the axle ⑨.
3) Mount the COUPLE GEAR R ⑦ onto the ROD ASS'Y axle ⑩. When doing so, match the couple gear position with the IDLER GEAR R ⑧ as shown in Fig. A.
4) Mount the LEVER GEAR ASS'Y R ⑤ onto the axles ⑪ and ⑫. Match position to the IDLER GEAR R ⑧ as shown in Fig. A.
5) Mount the E ring ④ onto the axle ⑫.
6) Mount the MAIN GEAR ③ onto the axle ⑪. When doing so, match position to the IDLER GEAR R ⑧ as shown in Fig. A.
7) Hook the SPRING COIL ② to the notch ⑬ in the MAIN GEAR R ③ and the LEVER GEAR ASS'Y R.
8) Mount the IDLER GEAR ① onto the axle ⑭. When doing so, match position to the MAIN GEAR as shown in Fig. A.
9) Mount the GEAR BRACKET ASS'Y and the COMPL CASSETTE MECHANISM ASS'Y as instructed in 5-2-2. and 5-2-1., respectively.



Positioning Alignment Marks
Fig. A
⑤Lever Gear Ass'y
⑧Idler Gear
③Main Gear
⑦Couple Gear
Positionning Alignment Marks
①Idler Gear
⑫Axle
⑪Axle
⑭Axle
⑨Axle
Rod Ass'y Shaft
Couple Gear
⑤Lever Gear Ass'y R
①Idler Gear
③Main Gear
④E Ring
⑬ (Hook for spring coil)
②Spring Coil
⑧Idler Gear
⑦Couple Gear R
⑩Rod Ass'y Shaft
⑥Hook

Fig. 5-2-3. Cassette Drive Gears (Right Side)

5-2-4. Cassette Drive Gear (Left) (See Fig. 5-2-4)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the COUPLE GEAR R as instructed in 5-2-3.
3) Remove the ROD ASS'Y ①.
4) Remove the E ring ②.
5) Remove the hook ③, then remove the LEVER GEAR ASS'Y L ④. Take care not to open the hook ③ too much, otherwise it may get deformed or broken. If it does, replace it.
6) Remove the SPRING COIL ⑤ from the LEVER GEAR ASS'Y ④.
7) Remove the IDLER GEAR L ⑥ and the DOOR OPEN LEVER ⑦.

2. Remounting

1) Apply grease to the axles ⑧, ⑨ and ⑩.
2) Apply grease to the IDLER GEAR L ⑥.
3) Mount the DOOR OPEN LEVER ⑦ onto the axle ⑧. Do it so that the end of the DOOR OPEN LEVER ⑦ leans against the front side of the CASSETTE DOOR ⑪ as shown in Fig. A.
4) Mount the IDLER GEAR L ⑥ onto the axle ⑧.
5) Pass the ROD ASS'Y ① through the hole ⑫. Match position of the COUPLE GEAR L ⑬ and the IDLER GEAR L ⑥ as shown in Fig B.
6) Mount the COUPLE GEAR R as instructed in 5-2-3.
7) Hook the SPRING COIL ⑤ to the LEVER GEAR ASS'Y L ④.
8) Mount the LEVER GEAR ASS'Y L ④ onto the axle ⑨ and the shaft ⑩. Match position to the IDLER GEAR L ⑥ as shown in Fig. B.
9) Mount the COMPL CASSETTE MECHANISM onto the chassis as instructed in 5-2-1.

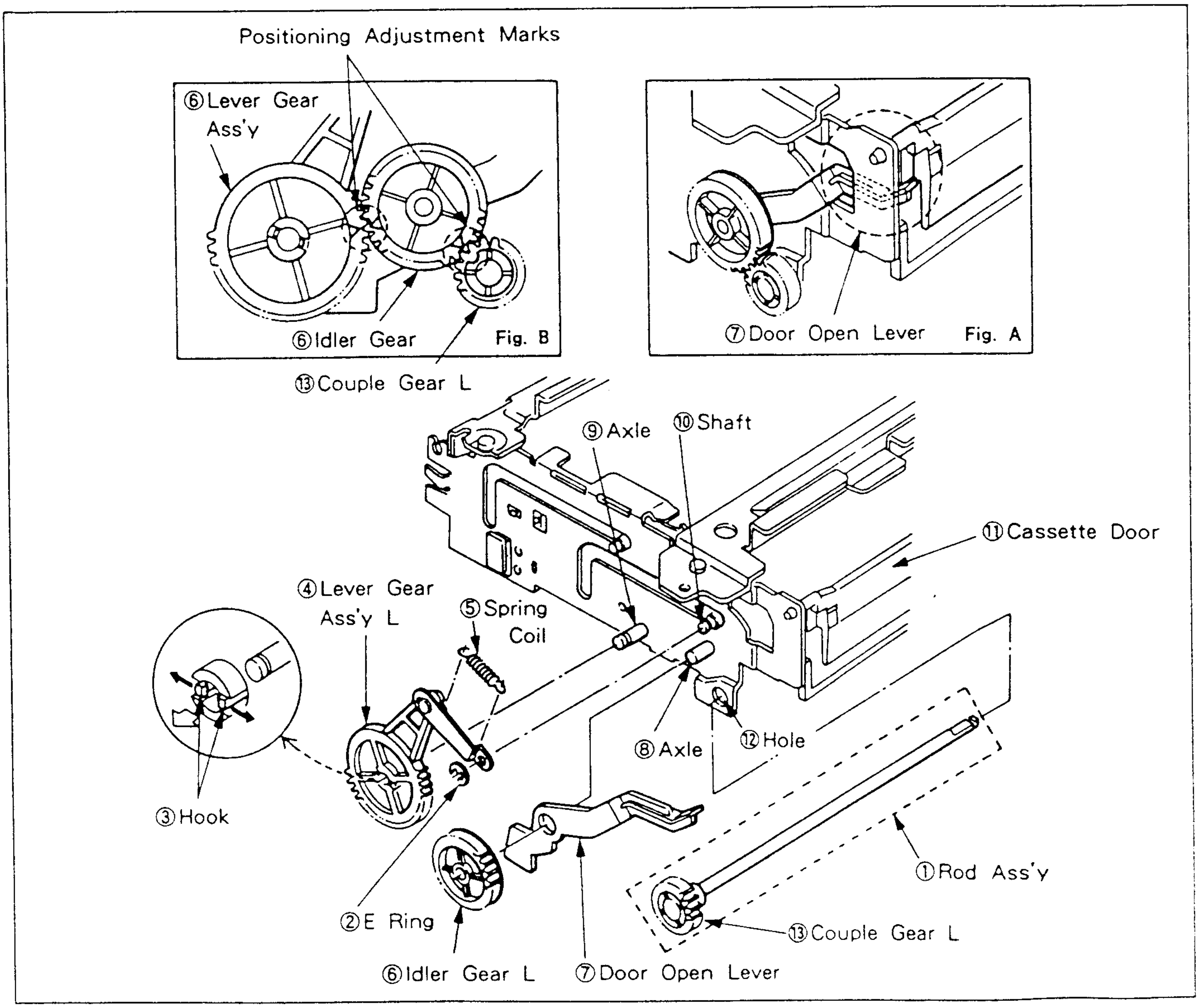

Positioning Adjustment Marks
⑥Lever Gear Ass'y
⑥Idler Gear
Fig. B
⑬Couple Gear L
⑦Door Open Lever
Fig. A
⑨Axle
⑩Shaft
⑪Cassette Door
④Lever Gear Ass'y L
⑤Spring Coil
⑧Axle
⑫Hole
③Hook
①Rod Ass'y
②E Ring
⑬Couple Gear L
⑥Idler Gear L
⑦Door Open Lever

Fig. 5-2-4. Cassette Drive Gears (Left Side)

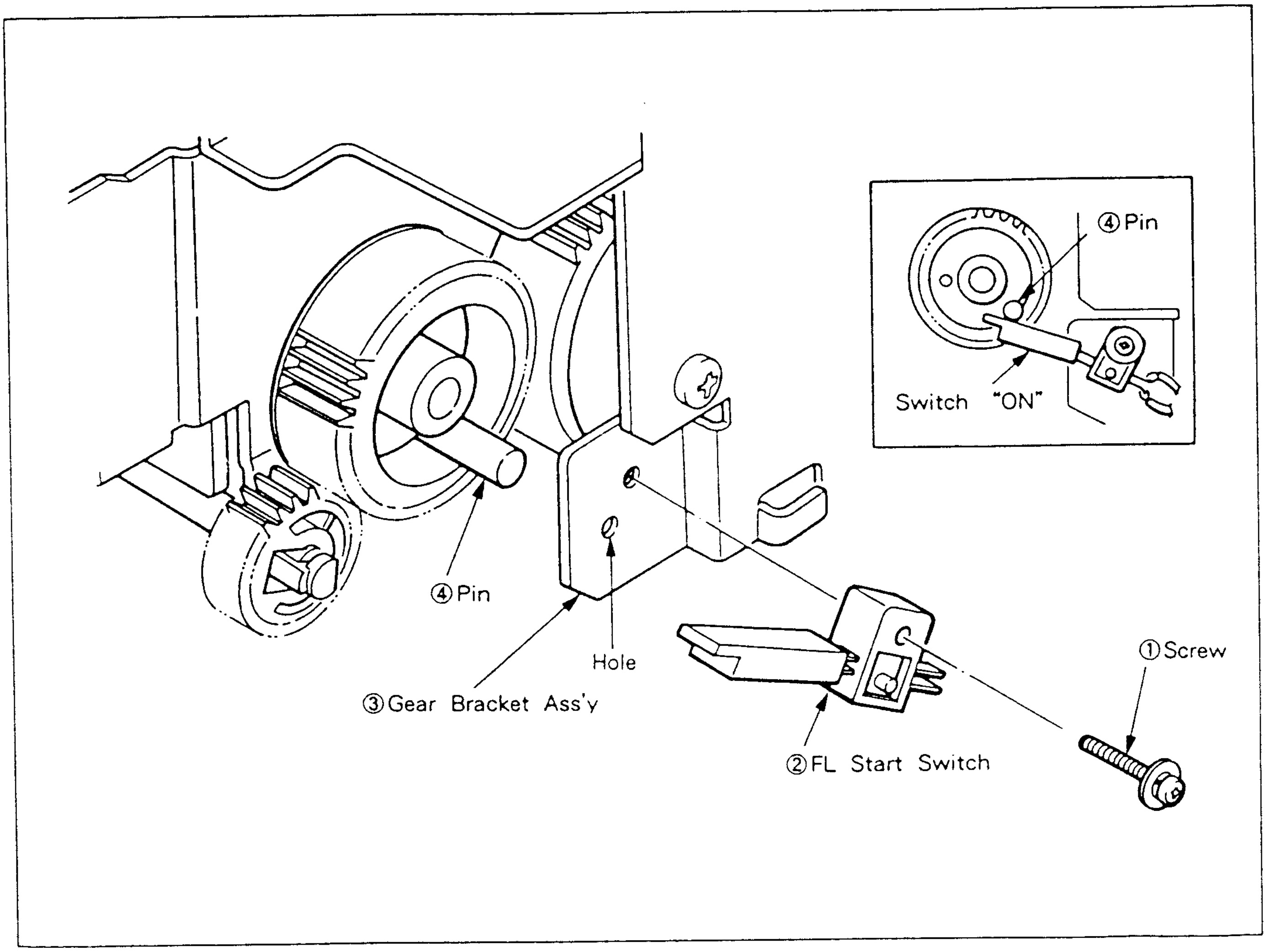
5-2-5. FL Start Switch (See Fig. 5-2-5.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the screw ①.
3) Remove the lead wire of the FL START SWITCH ②.

2. Remounting

1) Solder the lead wire to the FL START SWITCH ② terminal.
2) Align the FL START SWITCH ② protuberance to the hole, then mount it onto the GEAR BRACKET ASS'Y ③ with the screw ①. Do it so that the FL START SWITCH ② is turned ON by holding the pin ④ of IDLER GEAR in the EJECT completed mode.
3) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.


④Pin
Switch "ON"
④Pin
Hole
③Gear Bracket Ass'y
②FL Start Switch
①Screw

5-2-5. FL Start Switch

5-2-6. T-Top Sensor, T-End Sensor (See Fig. 5-2-6.)

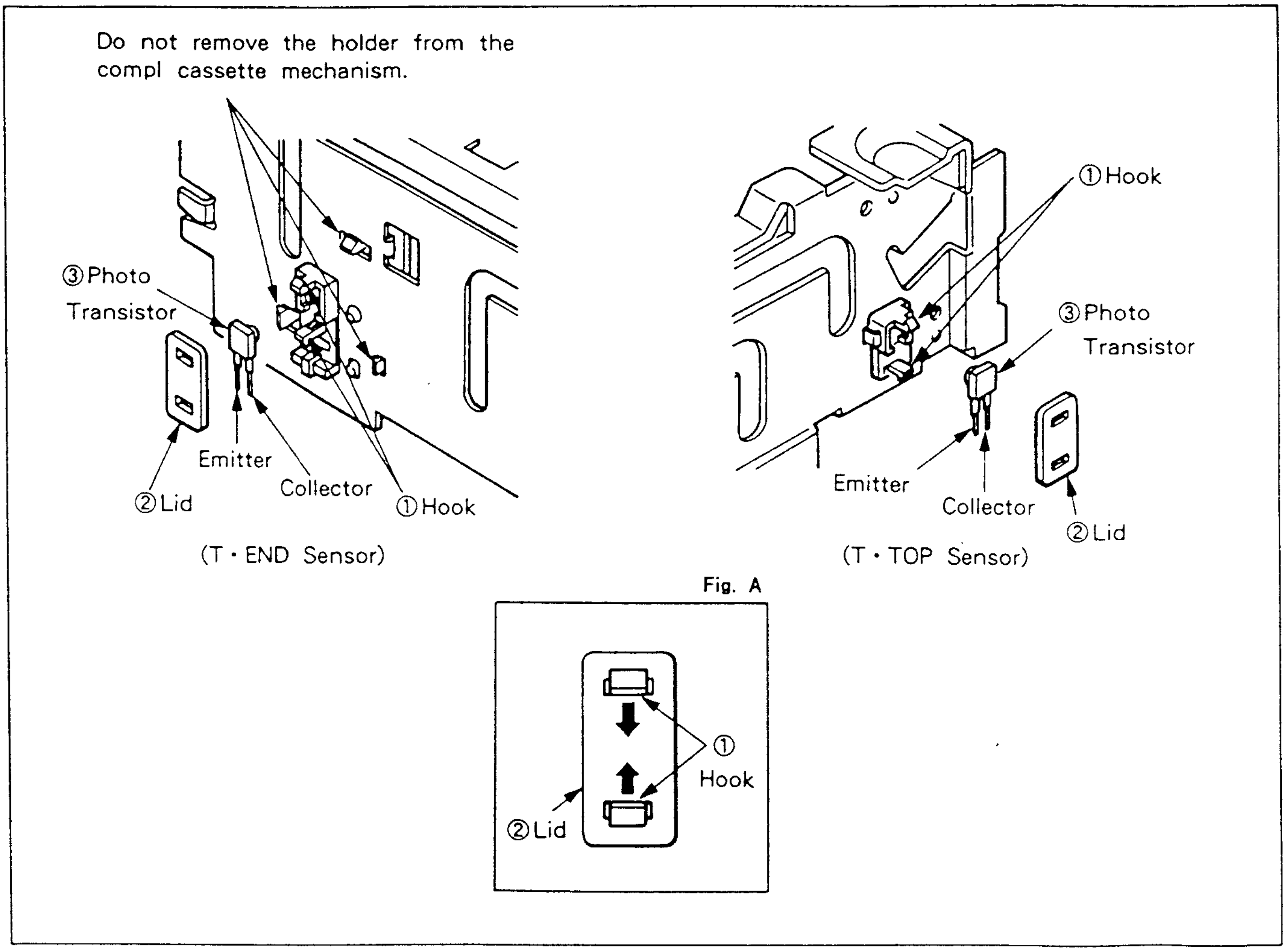
1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) When removing the T-TOP SENSOR, remove the GEAR BRACKET ASS'Y as instructed in 5-2-2.
3) Unhook the hook ① as instructed in Fig. A, then remove the LID ②. Take care not to push the hook ① too much, otherwise it may be deformed or broken.
4) Remove the phototransistors ③, then remove the lead wire.

Note : Mounting position of the transistor holder on the T-END SENSOR side is precisely adjusted at the factory, so do never remove it from the COMPL CASSETTE MECHANISM.

2. Remounting

1) Solder the brown lead wire to the emitter side, and the red lead wire to the collector side of the T-TOP SENSOR phototransistor ③.
   Solder the orange lead wire to the emitter side, and the yellow lead wire to the collector side of the T-END SENSOR phototransistor.
2) Mount the phototransistors ③ onto their respective holders.
3) Mount the LID ② and fix it with the hook ①.
4) Mount the GEAR BRACKET ASS'Y as instructed in 5-2-2.
5) Mount the COMPL CASSETTE MECHANISM as insturcted in 5-2-1.


Do not remove the holder from the compl cassette mechanism.
③Photo Transistor
Emitter
Collector
②Lid
①Hook
(T · END Sensor)
①Hook
③Photo Transistor
Emitter
Collector
②Lid
(T · TOP Sensor)
Fig. A
①
Hook
②Lid

5-2-6. T TOP Sensor & T END Sensor

5-3. COMPL MOTOR BRACKET (LOADING MOTOR BLOCK)

5-3-1. COMPL Motor Bracket

1. Removal

1) Remove the COMPL VP-1 and the PRE-AMP. BRACKET as instructed in 5-1.
2) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
3) Remove the two screws ① and the other one ⑩, then remove the COMPL MOTOR BRACKET ② (see Fig. 5-3-1.).

2. Remounting

1) Set the mechanism chassis to the INITIAL mode. In this mode, look at the mechanism chassis positioning holes ③ just from above and align the MAIN CAM ④ and MODE CAM ⑤ positioning holes as shown in Fig. 5-3-2.
2) Set the COMPL MOTOR BRACKET to the INITIAL mode with the mode selector (VHJ-0050). In thisposition, the FRONT LOADING GEAR △ mark ⑥ is aligned with the FRONT BRACKET ASS'Y initial position mark ⑦ (see Fig. 5-3-3.).
3) Align the ROTARY SWITCH (mode detector switch) ⑧ with the INITIAL mode position mark ⑨ (see Fig. 5-3-4.).
4) Line up LOADING MOTOR bracket ② with PROTUBERANCE ⑪ and POSITIONING HOLE ⑫, and attach with two screws ① and one screw ⑩. (Refer to Fig. 5-3-1.)
5) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
6) Mount the COMPL VP-1 and the PRE-AMP. BRACKET as instructed in 5-1.

Note : Normal mechanism operation cannot be achieved if initial positioning of the MAIN CAM ④, the MODE CAM ⑤ and the ROTARY SWITCH (mode detector switch) ⑧ are not performed precisely.

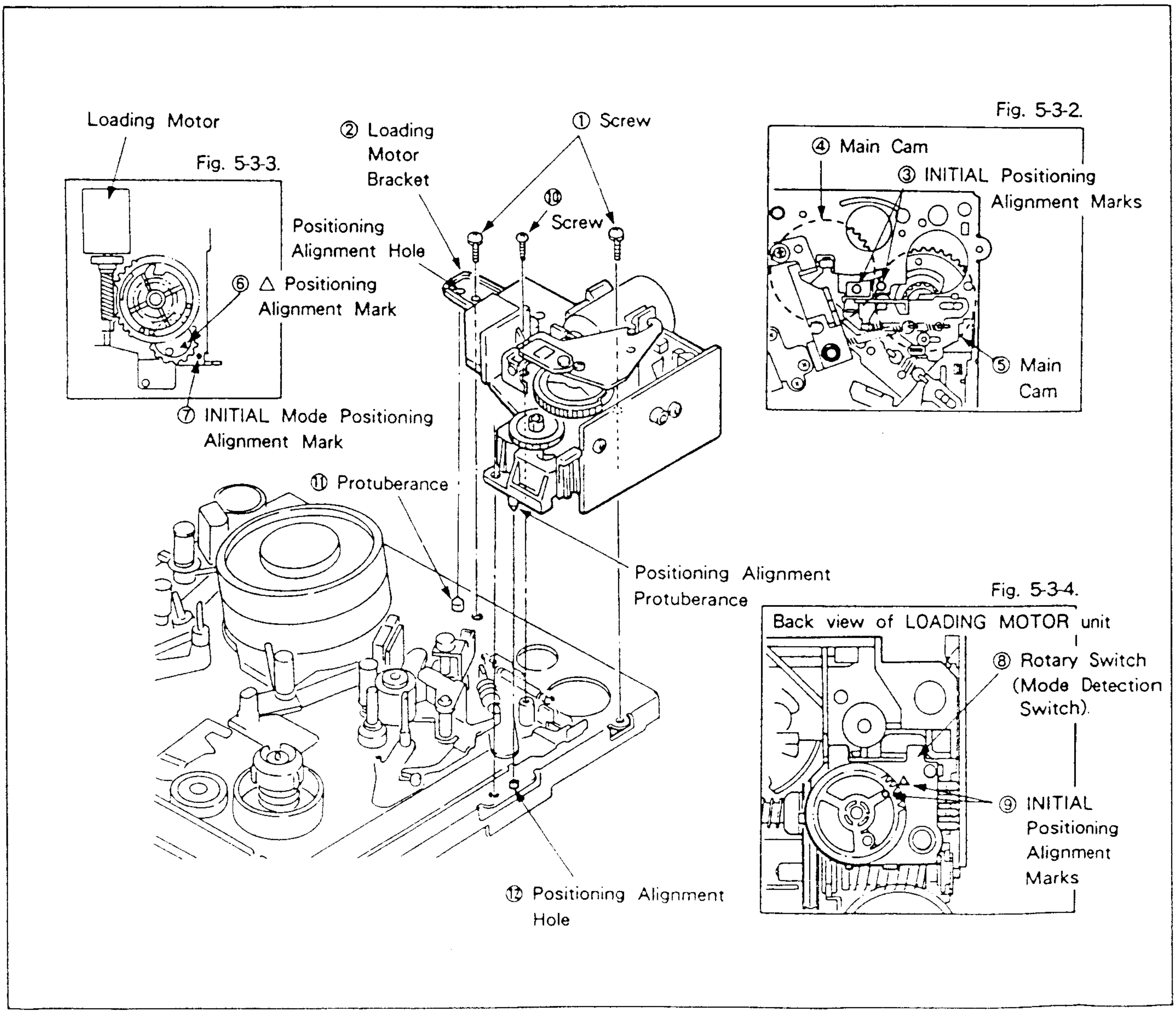

Loading Motor
Fig. 5-3-3.
② Loading Motor Bracket
① Screw
⑩ Screw
Positioning Alignment Hole
⑥ △ Positioning Alignment Mark
⑦ INITIAL Mode Positioning Alignment Mark
⑪ Protuberance
Positioning Alignment Protuberance
⑫ Positioning Alignment Hole
Fig. 5-3-2.
④ Main Cam
③ INITIAL Positioning Alignment Marks
⑤ Main Cam
Fig. 5-3-4.
Back view of LOADING MOTOR unit
⑧ Rotary Switch (Mode Detection Switch).
⑨ INITIAL Positioning Alignment Marks

Fig. 5-3-1 COMPLE Motor Bracket

5-3-2. Loading Motor (Refer to Fig. 5-3-5.)

1. Removal

LOADING MOTOR can be replaced after LOADING MOTOR BLOCK unit has been removed by referring to 5-3-1. The 1989 version of the mechanism allows LOADING MOTOR itself to be replaced without removing CASSETTE HOLDER BLOCK and LOADING MOTOR BLOCK. The following describes this procedure.

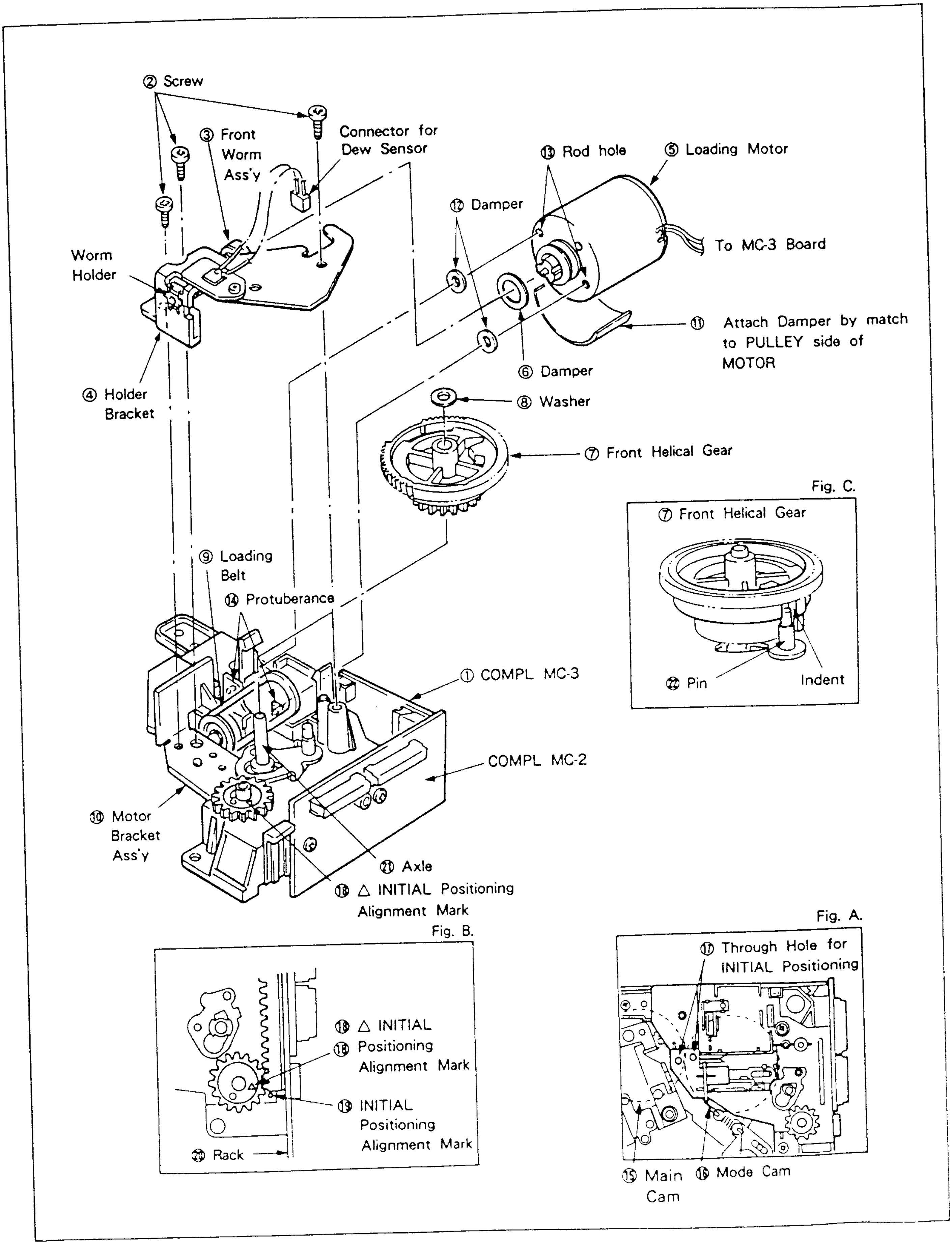
1) Use MODE SELECTOR (VHJ-0050) to set the mechanism to the initial mode.
2) Remove the connector for DEW SENSOR connected to the MC-3 board ①.
3) Remove three screws ② and remove HOLDER BRACKET ④ with FRONT WORM ASS'Y ③ still attached.
4) Remove DAMPER ⑥ attached to the pulley of LOADING MOTOR ⑤.
5) Remove FRONT HELICAL GEAR ⑦ and WASHER ⑧.
6) Remove soldered LEAD WIRE from the terminal of LOADING MOTOR ⑤.
7) Remove LOADING BELT ⑨.
8) Remove LOADING MOTOR ⑤ by lifting up from the back terminal side.

Note : The back terminal of LOADING MOTOR ⑤ is attached to MOTOR BRACKET ASS'Y ⑩ with glue.

2. Remounting

Before attaching LOADING MOTOR ⑤ to MOTOR BRACKET ASS'Y ⑩, confirm DAMPER ⑪ and DAMPER ⑫ shown in Fig. 5-3-5. are in the proper position on MOTOR BRACKET ASS'Y ⑩.

1) LOADING MOTOR ⑤ is mounted from the front pulley side by lining up ROD HOLE ⑬ and PROTUBERANCE ⑭ of MOTOR BRACKET ASS'Y ⑩.
2) Solder the lead wire from the MC-3 board to LOADING MOTOR ⑤ terminal. (Solder the red lead wire to the positive terminal side.)
3) Hang LOADING BELT ⑨ on the pulley.
4) After hanging BELT ⑨ on the pulley, confirm that the mechanism unit is in the initial mode. The initial mode is indicated by Fig. A of Fig. 5-3-5., and is the position in which INITIAL POSITIONING ALIGNMENT HOLEs of MAIN CAM ⑮ and MODE CAM ⑯ are lined up with THROUGH HOLE ⑰ of MOTOR BRACKET ASS'Y. If the initial mode is not selected, adjust with MODE SELECTOR (VHJ-0050).
5) As shown in Fig. B, confirm the positions of the △ POSITIONING ALIGNMENT MARK on FRONT LOAD GEAR ⑱ and INITIAL MARK ⑲ position of MOTOR BRACKET ASS'Y and the position relationship of CASSETTE HOLDER RACK ⑳.
6) Apply a light coat of grease to the entire sides of AXLE ㉑ and FRONT HELICAL GEAR ⑦.
7) Attach FRONT HELICAL GEAR ⑦ and WASHER ⑧ to AXLE ㉑. As shown in Fig. C, FRONT HELICAL GEAR ⑦ is attached so that the indent on the side is inside PIN ㉒ of FRONT LEVER ASS'Y.
8) Attach DAMPER ⑥ to LOADING MOTOR ⑤ pulley.
9) HOLDER BRACKET ④ is attached by engaging FRONT WORM ASS'Y ③ with LOADING MOTOR ⑤ pulley, and held in place with three screws ②.
10) Attach the connector of DEW SENSOR to the MC-3 board and return the mechanism to the eject completion using MODE SELECTOR.



② Screw
③ Front Worm Ass'y
Connector for Dew Sensor
⑬ Rod hole
⑤ Loading Motor
⑫ Damper
To MC-3 Board
Worm Holder
⑪ Attach Damper by match to PULLEY side of MOTOR
⑥ Damper
④ Holder Bracket
⑧ Washer
⑦ Front Helical Gear
Fig. C.
⑦ Front Helical Gear
㉒ Pin
Indent
⑨ Loading Belt
⑭ Protuberance
① COMPL MC-3
COMPL MC-2
⑩ Motor Bracket Ass'y
㉑ Axle
⑱ △ INITIAL Positioning Alignment Mark
Fig. B.
⑱ △ INITIAL
⑱ Positioning Alignment Mark
⑲ INITIAL Positioning Alignment Mark
⑳ Rack
Fig. A.
⑰ Through Hole for INITIAL Positioning
⑮ Main Cam
⑯ Mode Cam

Fig. 5-3-5 Loadign motor

5-4. TAPE LOADING MECHANISM

5-4-1. Main Parts of the Tape Loading Mechanism (See Fig. 5-4-1.)

1. Removal

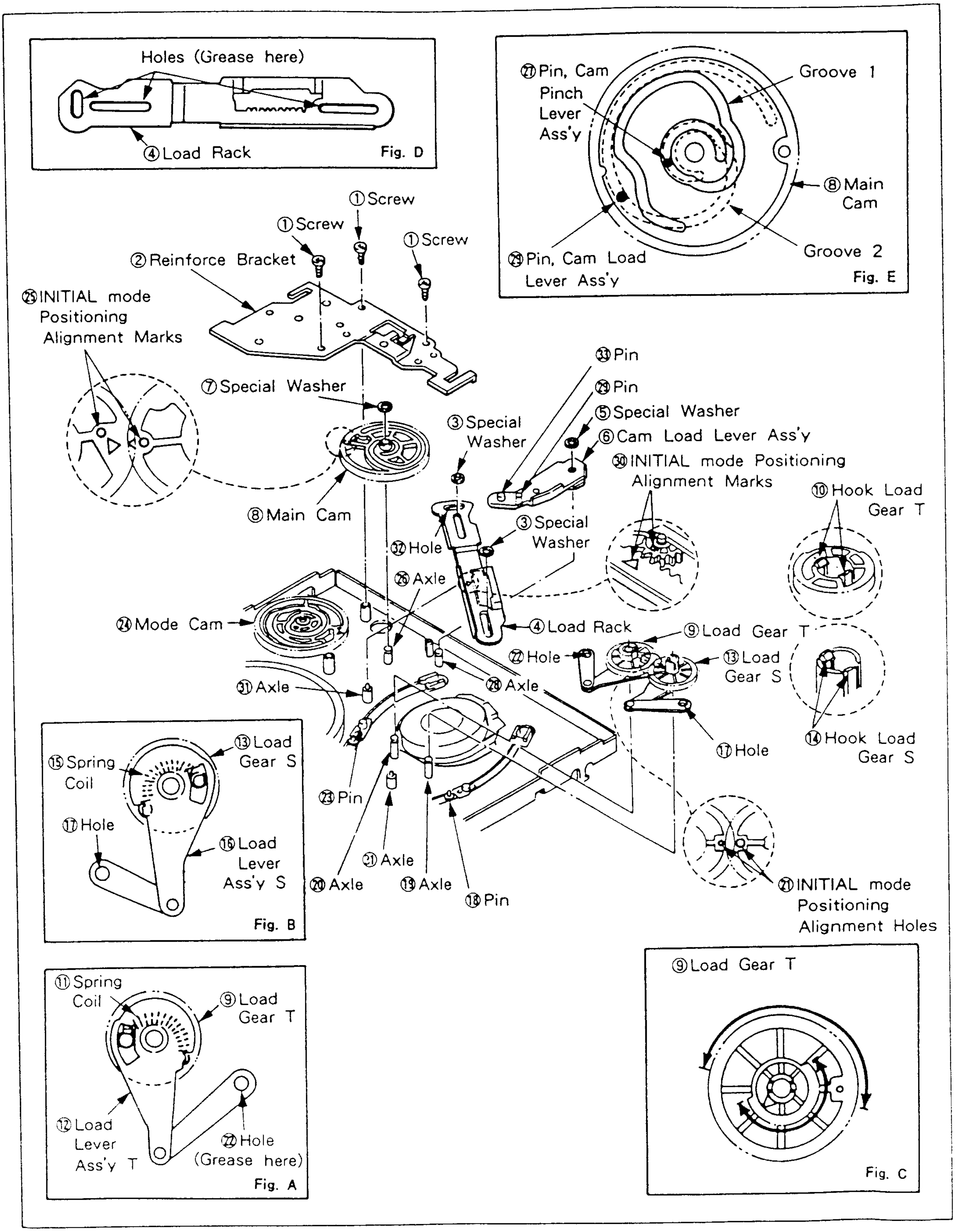
1) Remove connectors from the DRUM MOTOR board (SV-5).
2) Remove the three screws ①, then remove the REINFORCE BRACKET ②.
3) Remove the two special washers ③, then remove the LOAD RACK ④.
4) Remove the special washer ⑤, then remove the CAM LOAD LEVER ASS'Y ⑥.
5) Remove the stop washer ⑦, then remove the MAIN CAM ⑧.
6) Unhook the LOAD GEAR T hook ⑩, then remove the LOAD GEAR T ⑨ as shown in Fig. A, with the SPRING COIL ⑪ and the LOAD LEVER ASS'Y T ⑫ attached to it.
7) Unhook the LOAD GEAR S hook ⑭, then remove the LOAD GEAR S ⑬ as shown in Fig. B, with the SPRING COIL S ⑮ and the LOAD LEVER ASS'Y S ⑯ attached to it.

Note : Take care not to open the LOAD GEAR hooks too much, otherwise they may be deformed or broken. If they are, replace them.

2. Remounting

1) Apply grease to the inner surface of the LOAD LEVER ASS'Y S ⑯ hole ⑰, as shown in Fig. B.
2) Apply grease to the inner surface of the LOAD LEVER ASS'Y T ⑫ hole ㉒ and to the section of the LOAD GEAR T ⑨ indicated with an arrow in Fig. C.
3) Apply grease to GROOVEs 1 and 2 of the MAIN CAM ⑧, and to the outer side of the teeth.
4) Apply grease to the three oval holes of the LOAD RACK ④ as shown in Fig. D.
5) Apply grease to the outer surface of axles ⑲⑳㉖ and ㉘.
6) After assembling as shown in Fig. B, mount the LOAD GEAR S ⑬ onto the axle ⑲. Insert the ROLLER BASE S pin ⑱ into the LOAD LEVER ASS'Y S hole ⑰.
7) After assembling as shown in Fig. A, mount the LOAD GEAR T ⑨ onto the axle ⑳. When doing so, set the LOAD GEAR S ⑬ and the LOAD GEAR T ⑨ to the INITIAL mode position ㉑. Insert the ROLLER BASE T pin ㉓ into the hole ㉒ of the LOAD LEVER ASS'Y T ⑫.
8) Set the MAIN CAM ⑧ to the INITIAL mode position ㉕ with the MODE CAM ㉔, and mount onto the axle ㉖. Confirm that the CAM PINCH LEVER ASS'Y pin ㉗ gets into the MAIN CAM GROOVE 1 as shown in Fig. E.
9) Mount the special washer ⑦ to the axle ㉖.
10) Mount the CAM LOAD LEVER ASS'Y ⑥ onto the axle ㉘. Insert the pin ㉙ into the MAIN CAM GROOVE 2 as shown in Fig. E.
11) Mount the special washer ⑤ onto the axle ㉘.
12) Set the LOAD RACK ④ to the INITIAL mode position ㉚ with the LOAD GEAR T ⑨, and mount onto the two axles ㉛. Insert the CAM LOAD LEVER ASS'Y pin ㉝ into the hole ㉜.
13) Mount the two special washers ③ onto the two axles ㉛.
14) Mount the REINFORCE BRACKET ② with the three screws ①.
15) Insert the connector into the DRUM MOTOR board (SV-5).
16) Confirm that loading and unloading are performed smoothly.

Note : Be sure to perform INITIAL mode positioning of cams and gears precisely.


Holes (Grease here)
④ Load Rack
Fig. D
㉗ Pin, Cam Pinch Lever Ass'y
Groove 1
⑧ Main Cam
Groove 2
㉙ Pin, Cam Load Lever Ass'y
Fig. E
① Screw
① Screw
① Screw
② Reinforce Bracket
㉕ INITIAL mode Positioning Alignment Marks
⑦ Special Washer
⑧ Main Cam
㉝ Pin
㉙ Pin
⑤ Special Washer
③ Special Washer
⑥ Cam Load Lever Ass'y
㉚ INITIAL mode Positioning Alignment Marks
⑩ Hook Load Gear T
③ Special Washer
㉜ Hole
㉖ Axle
㉔ Mode Cam
④ Load Rack
⑨ Load Gear T
㉒ Hole
⑬ Load Gear S
㉛ Axle
㉘ Axle
⑰ Hole
⑭ Hook Load Gear S
⑮ Spring Coil
⑬ Load Gear S
⑰ Hole
⑯ Load Lever Ass'y S
Fig. B
㉓ Pin
㉑ Axle
⑳ Axle
⑲ Axle
⑱ Pin
㉑ INITIAL mode Positioning Alignment Holes
⑪ Spring Coil
⑨ Load Gear T
⑫ Load Lever Ass'y T
㉒ Hole (Grease here)
Fig. A
⑨ Load Gear T
Fig. C

5-4-1. Loading Mechanism Main Parts

5-4-2. Mode Cam (See Fig. 5-4-2.)

1. Removal

1) Set the INITIAL mode with the mode selector (VHJ-0050).
2) Remove the REINFORCE BRACKET as instructed in 5-4-1.
3) Remove the two stop washers ①, then remove the CAM PLATE SLIDE ASS'Y ②.
4) Remove the MODE CAM ③.

2. Remounting

1) Referring to 5-4-1., confirm that the MAIN CAM is in the INITIAL mode position.
2) In case the MAIN CAM is misplaced, use the mode selector (VHJ-0050) to align the MAIN CAM positioning hole with the chassis INITIAL mode position hole (refer to 5-4-1. for the INITIAL mode position). Since the ROTARY SWITCH (mode detector switch) does not rotate, the mode selector indicator lamp will not show the correct mode.
3) Align the ROTARY SWITCH (mode detector switch) ④ with the INITIAL mode position mark ⑤ as shown in Fig. A.
4) Mount the MODE CAM ③ onto the axle ⑥. Do it so that the SLIDE CAM ASS'Y pin ⑪ is placed in the GROOVE 3 as shown in Fig. B.
5) Mount the CAM PLATE SLIDE ASS'Y ② onto the axles ⑥ and ⑦. Do it so that the pin ⑧ gets into the GROOVE 4 of the MODE CAM as shown in Fig. B, and the point ⑨ of the bent-up part into the ACT PLATE SLIDE ASS'Y hole ⑩.
6) Mount the two special washers ① onto the axles ⑥ and ⑦.
7) Mount the REINFORCE BRACKET as instructed in 5-4-1.

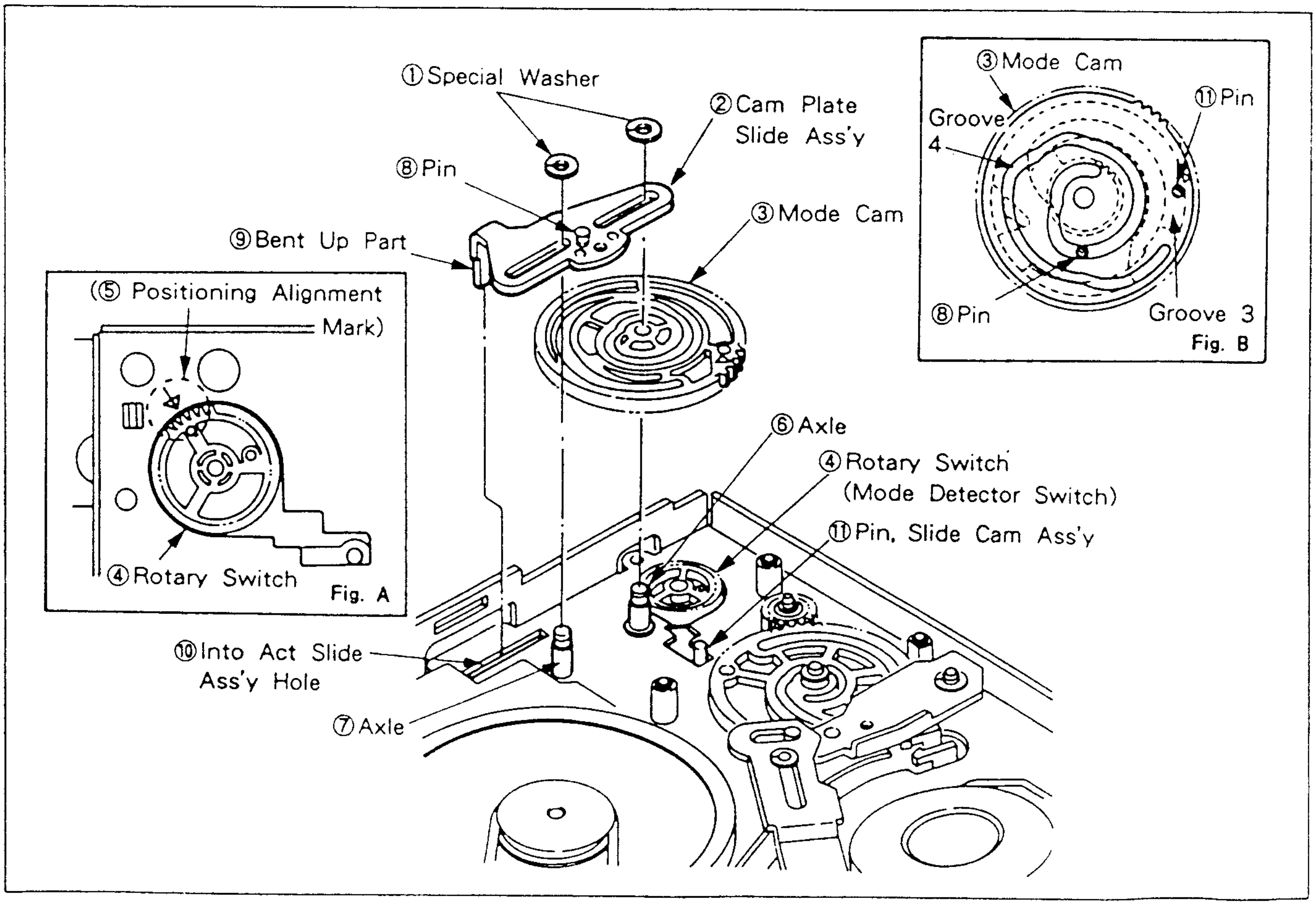

①Special Washer
②Cam Plate Slide Ass'y
⑧Pin
③Mode Cam
⑨Bent Up Part
(⑤ Positioning Alignment Mark)
④Rotary Switch
Fig. A
⑥Axle
④Rotary Switch (Mode Detector Switch)
⑪Pin, Slide Cam Ass'y
⑩Into Act Slide Ass'y Hole
⑦Axle
③Mode Cam
⑪Pin
Groove 4
⑧Pin
Groove 3
Fig. B

Fig. 5-4-2. Mode Cam

5-5. COMPL HEAD BRACKET (ACE HEAD) (See Fig. 5-5-1.)

1. **Removal**

1) Remove the COMPL HEAD BRACKET special mounting nut ②.
2) Remove the SPACER ③, the COMPL HEAD BRACKET ① and the ACE HEAD SPRING COIL ④, in that order.

Note : Take care not to scratch or soil the ACE head surface.

2. **Remounting**

1) Apply grease to the axle ⑥ as shown in Fig. A.
2) Apply grease to the spot where the COMPL HEAD BRACKET ① makes contact with the STOPPER ⑦ (See Fig. A).
3) Mount the ACE HEAD SPRING COIL ④ and the COMPL HEAD BRACKET ①, in that order, onto the axle ⑥. Hook one end of the ACE HEAD SPRING COIL ④ to the notch ⑤, and the other end to the COMPL HEAD BRACKET, so that the COMPL HEAD BRACKET is pressed against the STOPPER ⑦ (See Fig. A).
4) Mount the SPECIAL NUT ② onto the axle ⑥ through the SPACER ③.
5) Clean the ACE head surface with a chamois leather moistened with methyl alcohol.
6) Perform ACE head adjustment as instructed in 6-4.

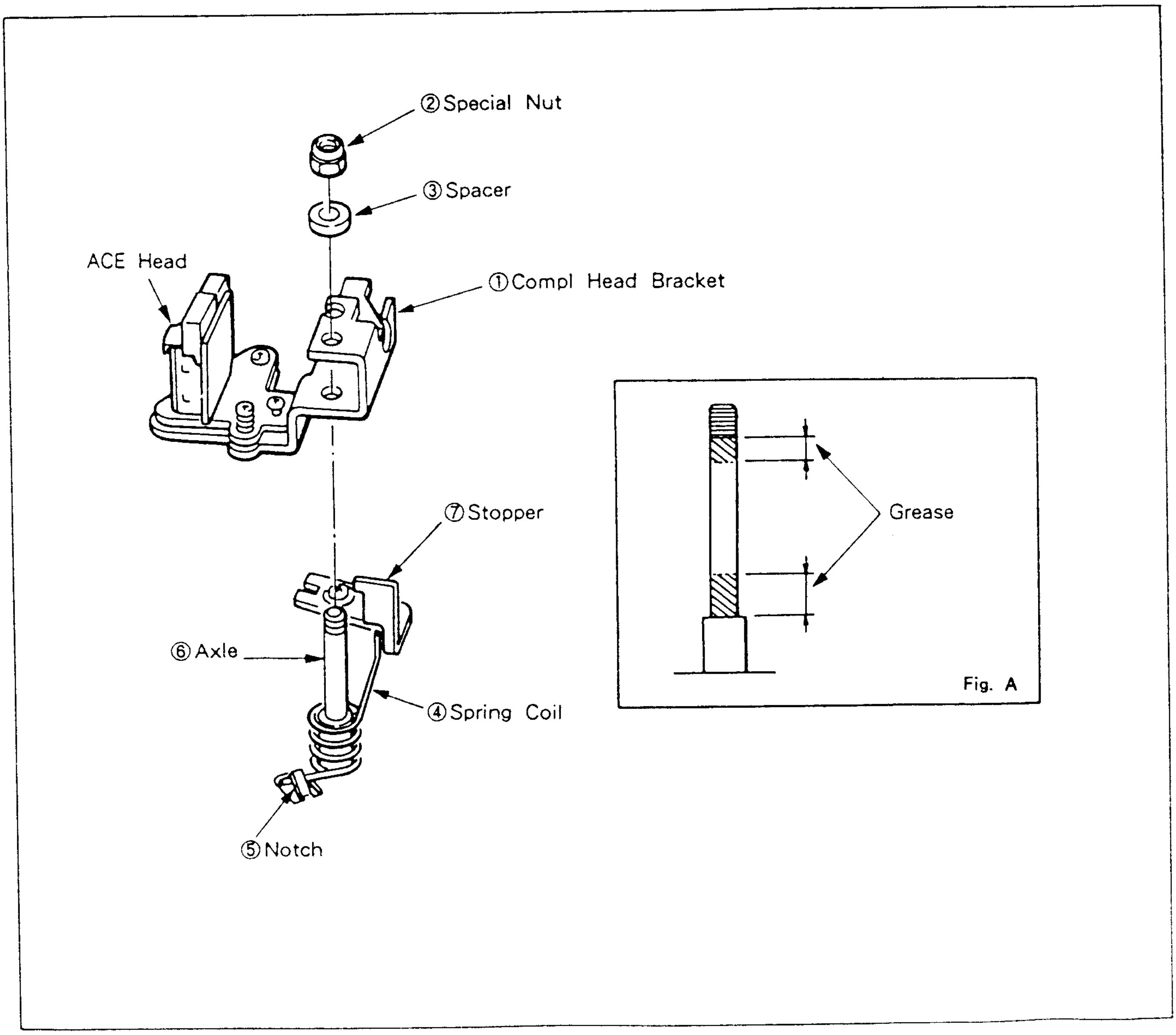

②Special Nut
③Spacer
ACE Head
①Compl Head Bracket
⑦Stopper
⑥Axle
④Spring Coil
⑤Notch
Grease
Fig. A

Fig. 5-5-1. Compl Head Bracket (ACE Head)

5-6. PINCH ROLLER PRESSURE MECHANISM (See Fig. 5-6-1.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the COMPL HEAD BRACKET as instructed in 5-5.
3) Remove the PINCH SPRING COIL ①.
4) Remove the special washer ②, then remove the PINCH LEVER ASS'Y ③.
5) Remove the REV GUIDE LEVER SPRING COIL ④.
6) Remove the REV GUIDE LEVER ASS'Y ⑥ from the plastic molding bearing hook ⑤ at the bottom. Take care not to open the hook too much, otherwise it may be deformed or broken.
7) Remove the LINK LOCK SPRING COIL ⑦.
8) Remove the special washer ⑧, then remove the PINCH CAM LEVER ASS'Y ⑨.
9) Remove the ACT PINCH SLIDE ASS'Y ⑩.

2. Remounting

1) Apply grease to pins ⑫/⑬ and axles ⑯/⑱.
2) Apply grease to the ACT PINCH SLIDE ASS'Y pin ⑰.
3) Set the INITIAL mode with the mode selector (VHJ-0050).
4) Mount the ACT PINCH SLIDE ASS'Y ⑩ onto pins ⑫ and ⑬.
5) Insert the pin ⑭ of the PINCH CAM LEVER ASS'Y ⑨ into the MAIN CAM ⑪ GROOVE 1, and mount onto the axle ⑯ while inserting the pin ⑰ of the ACT PINCH SLIDE ASS'Y into the hole ⑮.
6) Mount the special washer ⑧ onto the axle ⑯.
7) Hook the LINK LOCK SPRING COIL ⑦ to the PINCH CAM LEVER ASS'Y ⑨.
8) Mount the REV GUIDE LEVER ASS'Y ⑥ to the plastic molding bearing, then fix it with the hook ⑤ at the bottom.
9) Hook the REV GUIDE LEVER SPRING COIL ④.
10) Mount the PINCH LEVER ASS'Y ③ to the axle ⑱.
11) Mount the special washer ② to the axle ⑱.
12) Hook the PINCH SPRING COIL ① between the ACT PINCH SLIDE ASS'Y ⑩ and the PINCH LEVER ASS'Y ③.
13) Mount the COMPL HEAD BRACKET as instructed in 5-5.
14) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
15) Perform ACE head adjustment as instructed in 6-4.

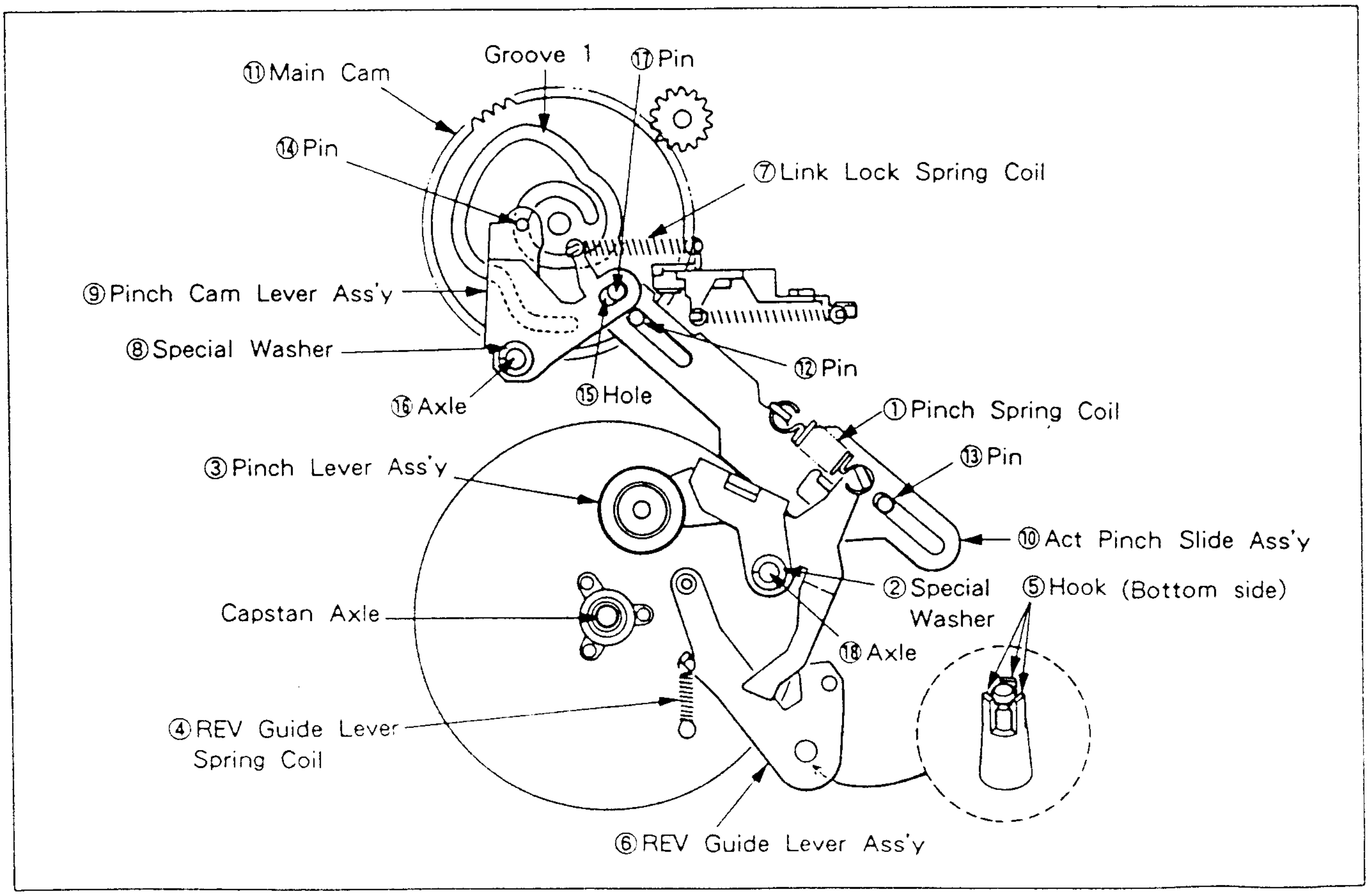

⑪Main Cam
Groove 1
⑰Pin
⑭Pin
⑦Link Lock Spring Coil
⑨Pinch Cam Lever Ass'y
⑧Special Washer
⑫Pin
⑯Axle
⑮Hole
①Pinch Spring Coil
③Pinch Lever Ass'y
⑬Pin
⑩Act Pinch Slide Ass'y
Capstan Axle
②Special Washer
⑤Hook (Bottom side)
⑱Axle
④REV Guide Lever Spring Coil
⑥REV Guide Lever Ass'y

Fig. 5-6-1. Pinch Roller Pressing Mechanism

5-7. BRAKE MECHANISM

5-7-1. Sub Take-up Brake Ass'y (See Fig. 5-7-1.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the SPRING COIL ①.
3) While pushing the hook ② in the direction of arrow, remove the SUB TAKE-UP BRAKE ASS'Y ③.

2. Remounting

1) Mount the SUB TAKE-UP BRAKE ASS'Y ③ onto the pin ④. Confirm that the hook ② is firmly hooked to the chassis.
2) Fit the SPRING COIL between hooks ⑤ and ⑥.
3) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

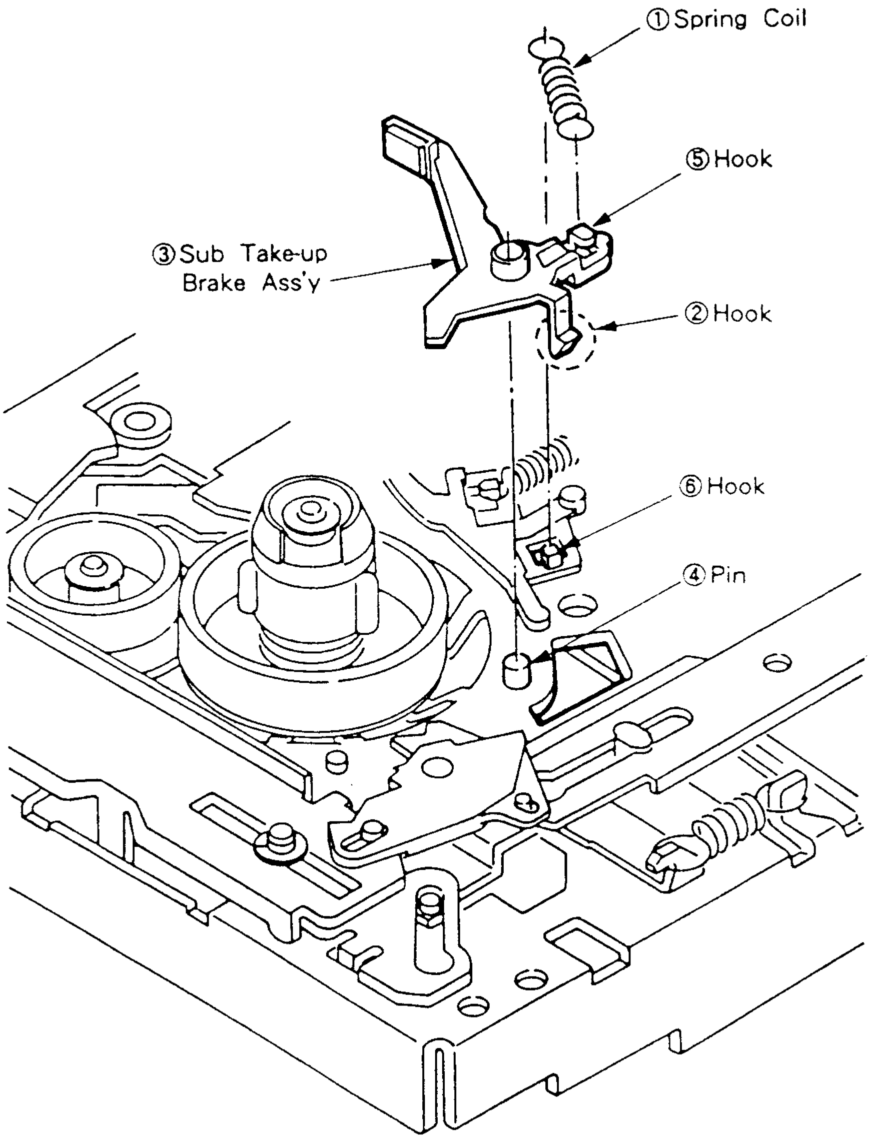

①Spring Coil
⑤Hook
③Sub Take-up Brake Ass'y
②Hook
⑥Hook
④Pin

Fig. 5-7-1. Sub Take-up Brake Ass'y

5-7-2. Supply Brake Ass'y and Take-up Brake Ass'y (See Fig. 5-7-2.)

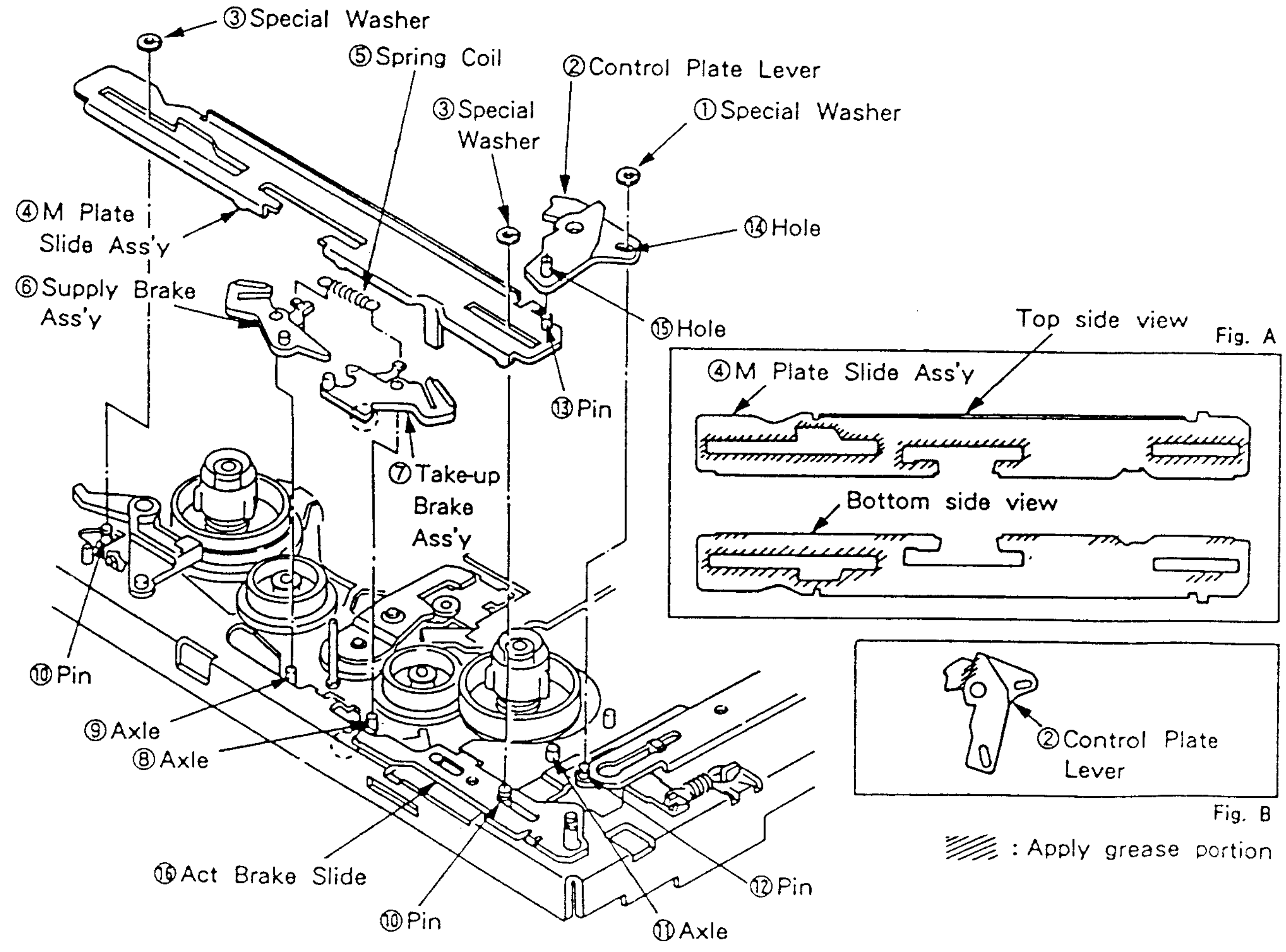
1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the SUB TAKE-UP BRAKE as instructed in 5-7-1.
3) Remove the special washer ①, then remove the CONTROL PLATE LEVER ②.
4) Remove the two special washers ③, then remove the M PLATE SLIDE ASS'Y ④.
5) Remove the SPRING COIL ⑤.
6) Remove the SUPPLY BRAKE ASS'Y ⑥ and the TAKE-UP BRAKE ASS'Y ⑦.

Note : Take care not to soil the brake shoes.

2. Remounting

1) Apply a thin layer of grease to axles ⑧ and ⑨.
2) Mount the TAKE-UP BRAKE ASS'Y ⑦ onto the axle ⑧.
3) Mount the SUPPLY BRAKE ASS'Y ⑥ onto the axle ⑨.
4) After applying a thin layer of grease to the M PLATE SLIDE ASS'Y ④ as shown in Fig. A, mount it onto the two pins ⑩.
5) Mount the two special washers ③ onto the two pins ⑩.
6) After applying grease to the CONTROL PLATE LEVER ② as shown in Fig. B, mount it onto the axle ⑪. Insert the ACT PLATE SLIDE ASS'Y pin ⑫ into the hole ⑭, and the M PLATE SLIDE ASS'Y pin ⑬ into the hole ⑮.
7) Mount the special washer ① onto the pin ⑫.
8) Mount the SUB TAKE-UP BRAKE as instructed in 5-7-1.
9) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.


③Special Washer
⑤Spring Coil
②Control Plate Lever
③Special Washer
①Special Washer
④M Plate Slide Ass'y
⑭Hole
⑥Supply Brake Ass'y
⑮Hole
⑬Pin
⑦Take-up Brake Ass'y
⑩Pin
⑨Axle
⑧Axle
⑯Act Brake Slide
⑩Pin
⑪Axle
⑫Pin
Top side view
Fig. A
④M Plate Slide Ass'y
Bottom side view
②Control Plate Lever
Fig. B
▨ : Apply grease portion

When assembling, the contact surfaces of Take-up Break ⑦ and the Break Slide ⑯ marked with ⁝ should contact but not overlap each other.

Fig. 5-7-2. Supply Brake Ass'y & Take-up Brake Ass'y

5-7-3. Tension Lever Ass'y and Band Holder Ass'y (See Fig. 5-7-3.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the SPRING COIL ①.
3) Remove the screw ③ fixing the BAND HOLDER ASS'Y ②.
4) Push the SUB SUPPLY BRAKE ④ in the direction of the arrow A, setting the BAND HOLDER ASS'Y ② free.
5) Open the hook ⑤ a little and remove the TENSION LEVER ASS'Y ⑥. Take care not to open the hook ⑤ too much, otherwise it may be deformed or broken.
6) Remove the hook ⑦ of the BAND HOLDER ASS'Y.

2. Remounting

1) Mount the BAND HOLDER ASS'Y hook ⑦ into the TENSION LEVER ASS'Y hole ⑧.
2) Insert the TENSION LEVER ASS'Y axle ⑨ into the hole ⑩ and confirm that the hook ⑤ is hooked.
3) While pushing the SUB SUPPLY BRAKE ④ in the direction of arrow, mount the BAND HOLDER ASS'Y ② with the screw ③.
4) Hook the SPRING COIL ① between the hooks ⑪ and ⑫.
5) Perform TENSION POLE position adjustment as instructed in 6-3.
6) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

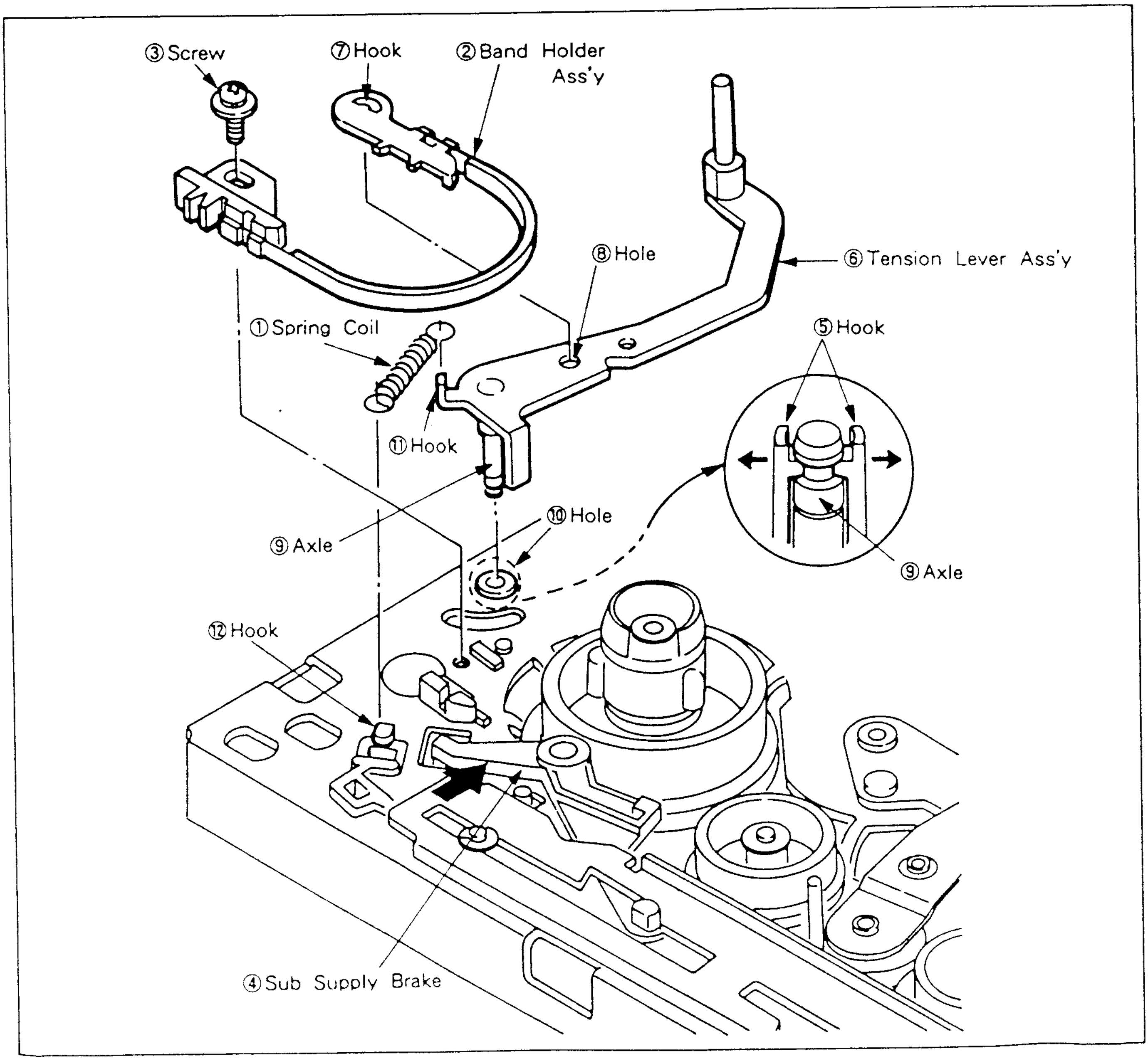

③Screw
⑦Hook
②Band Holder Ass'y
⑧Hole
⑥Tension Lever Ass'y
①Spring Coil
⑤Hook
⑪Hook
⑩Hole
⑨Axle
⑨Axle
⑫Hook
④Sub Supply Brake

Fig. 5-7-3. Tension Lever Ass'y & Band Holder Ass'y

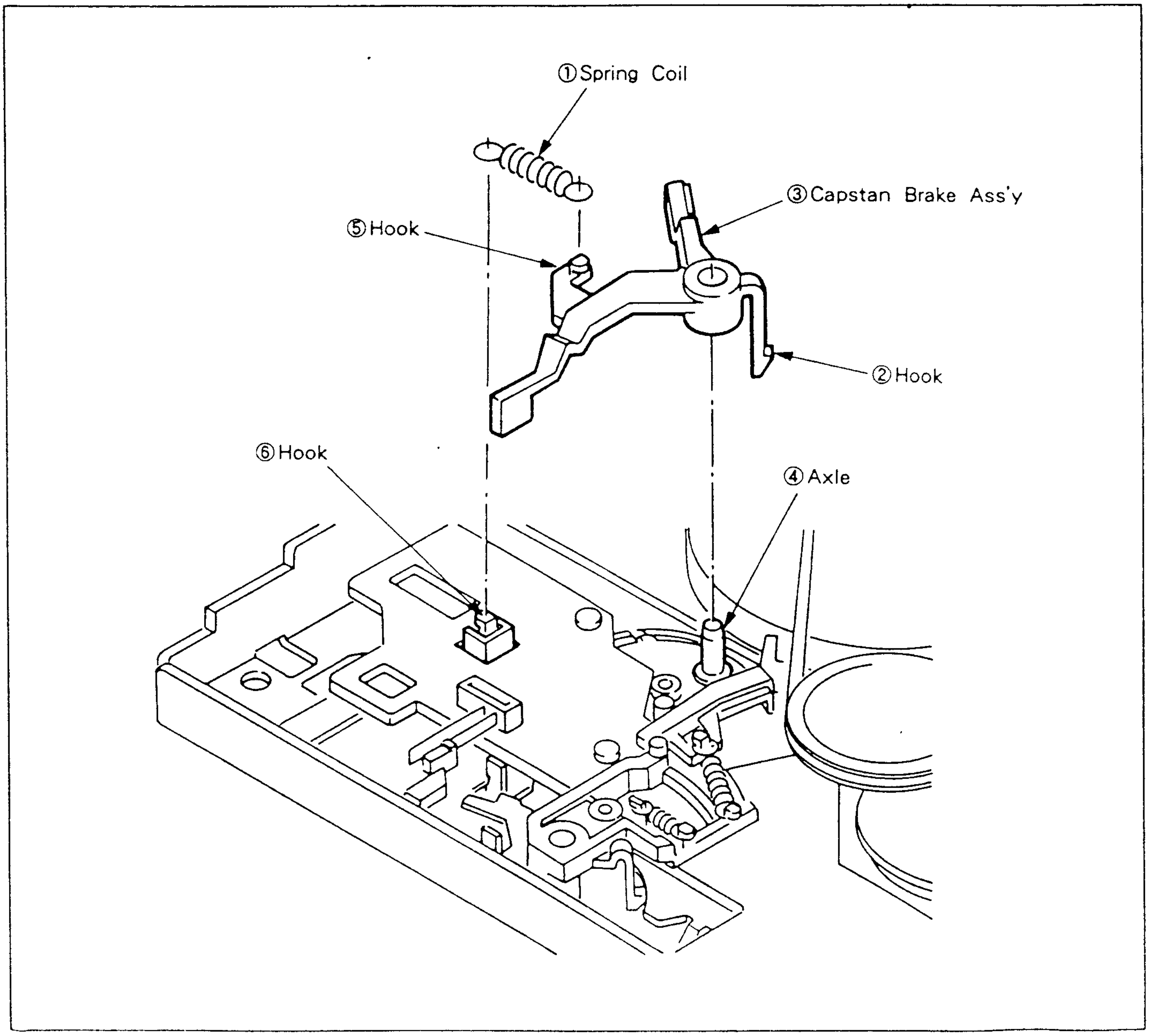
5-7-4. Capstan Brake Ass'y (See Fig. 5-7-4.)

1. Removal

1) Remove the SPRING COIL ①.
2) Unhook the hook ②, then remove the CAPSTAN BRAKE ASS'Y ③.

2. Remounting

1) Mount the CAPSTAN BRAKE ASS'Y ③ onto the axle ④. Confirm that the hook ② is hooked to the chassis.
2) Hook the SPRING COIL ① between hooks ⑤ and ⑥. Fix the hook ⑥ side with adhesive (use an adhesive that allows later detaching).


①Spring Coil
③Capstan Brake Ass'y
⑤Hook
②Hook
⑥Hook
④Axle

5-7-4. Capstan Brake Ass'y

5-8. REEL TABLE DRIVE MECHANISM

5-8-1. Supply Reel Ass'y and Supply Reel Gear (See Fig. 5-8-1.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the BAND HOLDER ASS'Y as instructed in 5-7-3.
3) Set the PLAY mode with the mode selector (VHJ-0050).
4) Remove the special washer ①, then remove the SUPPLY REEL ASS'Y ② and the washer ③.
5) Remove the special washer ④.
6) While pushing the SUPPLY BRAKE ASS'Y ⑤ in the direction of arrow A, remove the SUPPLY REEL GEAR ⑥ and the washer ⑦.

Note : Be sure that no dirt gets on the section where both brake shoes make contact.

2. Remounting

1) Apply a little oil (less than one drop) to the part of the axle ⑧ indicated by the arrow B, then mount the washer ⑦.
2) While pushing the SUPPLY BRAKE ASS'Y ⑤ in the direction of arrow A, mount the SUPPLY REEL GEAR ⑥ onto the axle ⑧.
3) Mount the special washer ④ to the axle ⑧.
4) Apply 1 drop of oil to the part of the axle ⑨ indicated by the arrow C, then mount the washer ③.
5) Mount the SUPPLY REEL ASS'Y ② onto the axle ⑨.
6) Perform reel table height adjustment as instructed in 6-2-1.
7) Mount the special washer ① onto the axle ⑨.
8) Mount the BAND HOLDER ASS'Y as instructed in 5-7-3.
9) Perform tension pole position adjustment as instructed in 6-3.
10) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

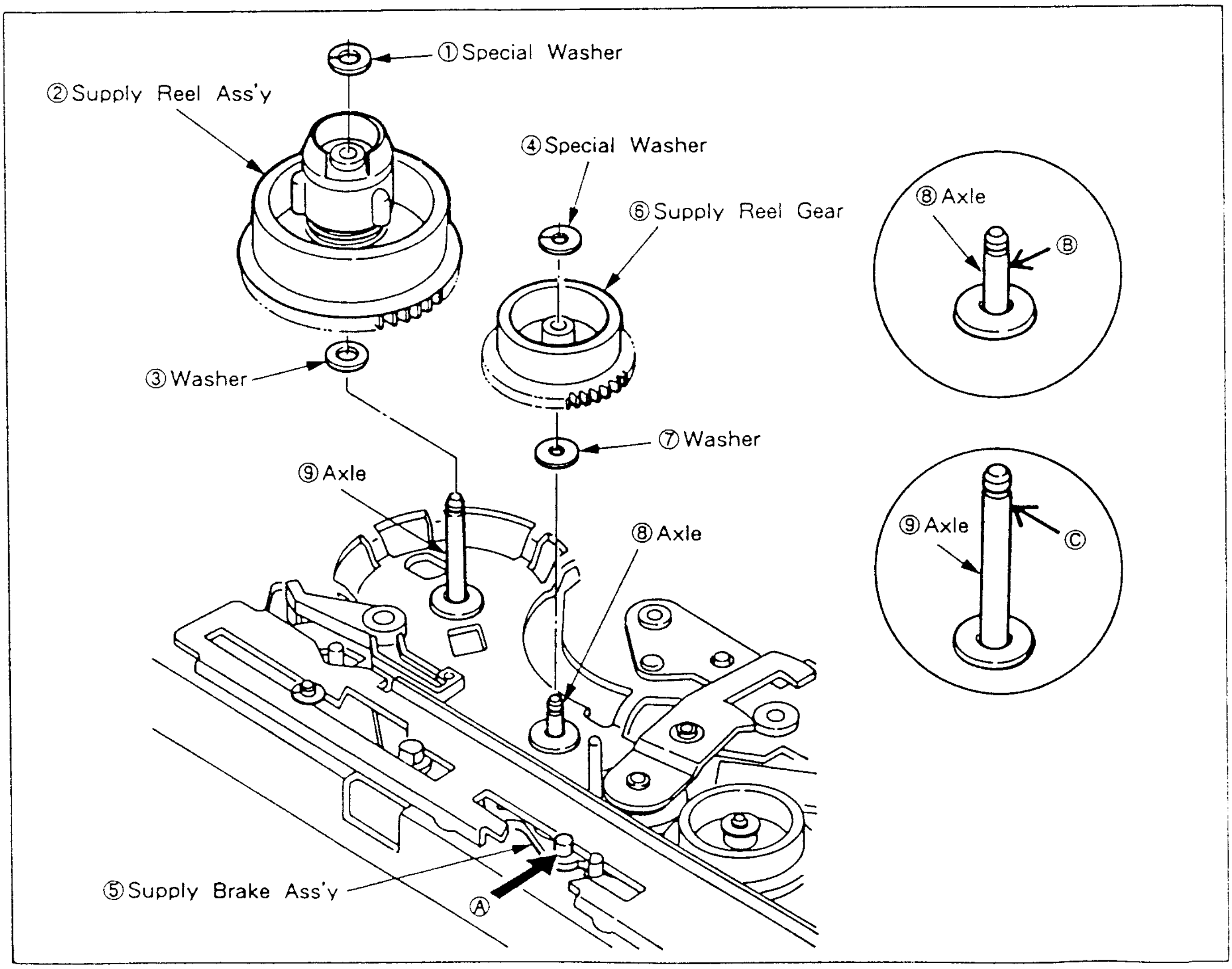


Fig. 5-8-1. Supply Reel Ass'y & Supply Reel Gear

5-8-2. Take-up Reel Ass'y (See Fig. 5-8-2.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the special washer ①.
3) Push the SUB TAKE-UP BRAKE ASS'Y ② in the direction of arrow A to release the brake, then remove the TAKE-UP REEL ASS'Y ③ and the washer ④.

Note : Be sure that no dirt gets on the section where both brake shoes make contact.

2. Remounting

1) Apply 1 drop of oil to the part of the axle ⑤ indicated by the arrow B, then mount the washer ④.
2) While pushing the SUB TAKE-UP BRAKE ASS'Y ② in the direction of arrow A, mount the TAKE-UP REEL ASS'Y ③ onto the axle ⑤.
3) Perform reel table height adjustment as instructed in 6-2.
4) Mount the special washer ① onto the axle ⑤.
5) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

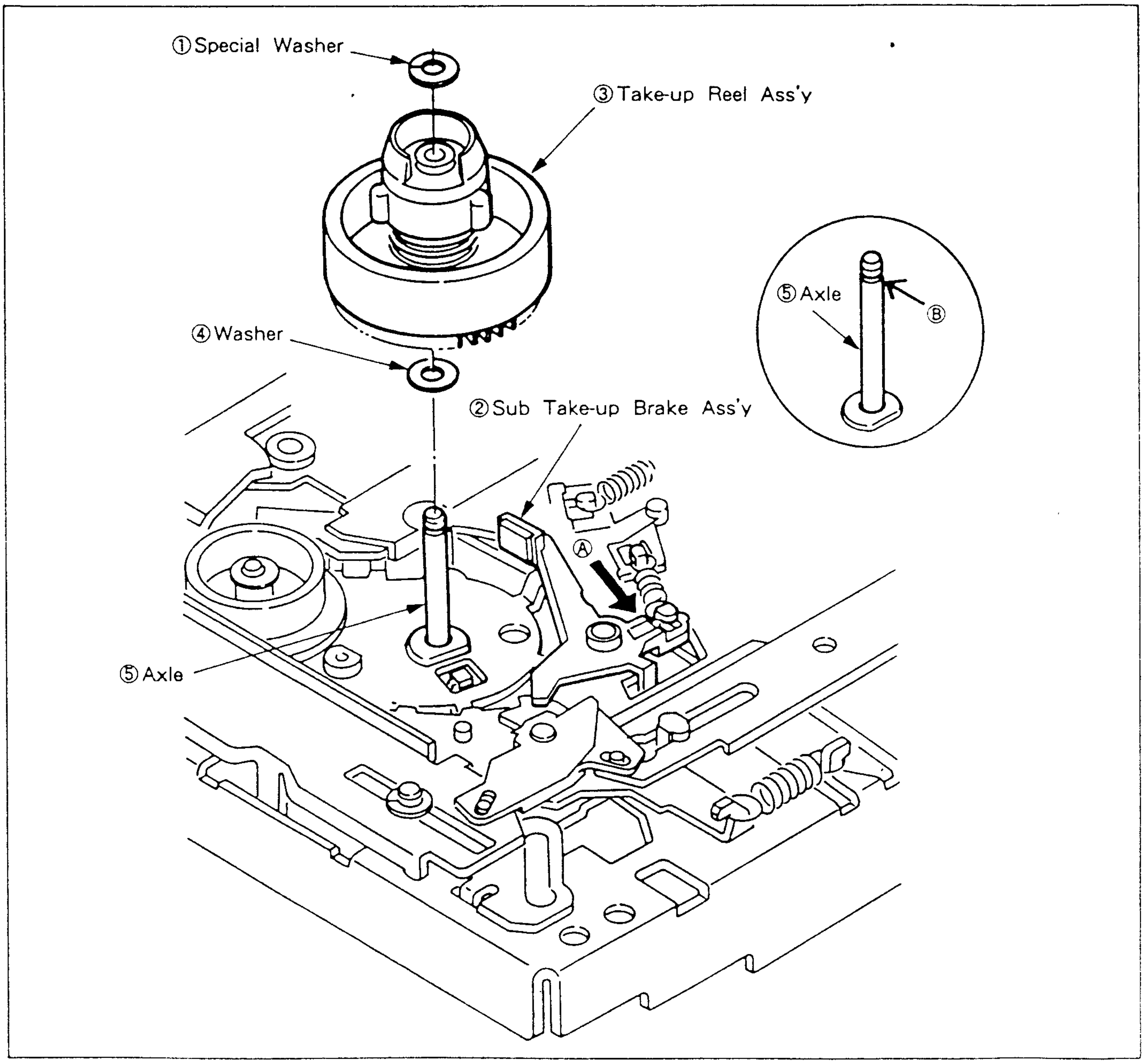


Fig. 5-8-2. Take-up Reel Ass'y

5-8-3. Take-up Reel Gear (See Fig. 5-8-3.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the TAKE-UP REEL ASS'Y as instructed in 5-8-2.
3) Remove the SUB TAKE-UP BRAKE ASS'Y as instructed in 5-7-1.
4) Remove the TAKE-UP BRAKE ASS'Y as instructed in 5-7-2.
5) Remove the special washer ①, then remove the TAKE-UP REEL GEAR ③ and the washer ④.

2. Remounting

1) Apply a little oil (less than one drop) to the part of the axle ⑤ indicated with an arrow.
2) Mount the washer ④ and the TAKE-UP REEL GEAR ③ onto the axle ⑤.
3) Mount the special washer ① onto the axle ⑤.
4) Mount the TAKE-UP BRAKE ASS'Y as instructed in 5-7-2.
5) Mount the SUB TAKE-UP BRAKE ASS'Y as instructed in 5-7-1.
6) Mount the TAKE-UP REEL ASS'Y as instructed in 5-8-2.
7) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

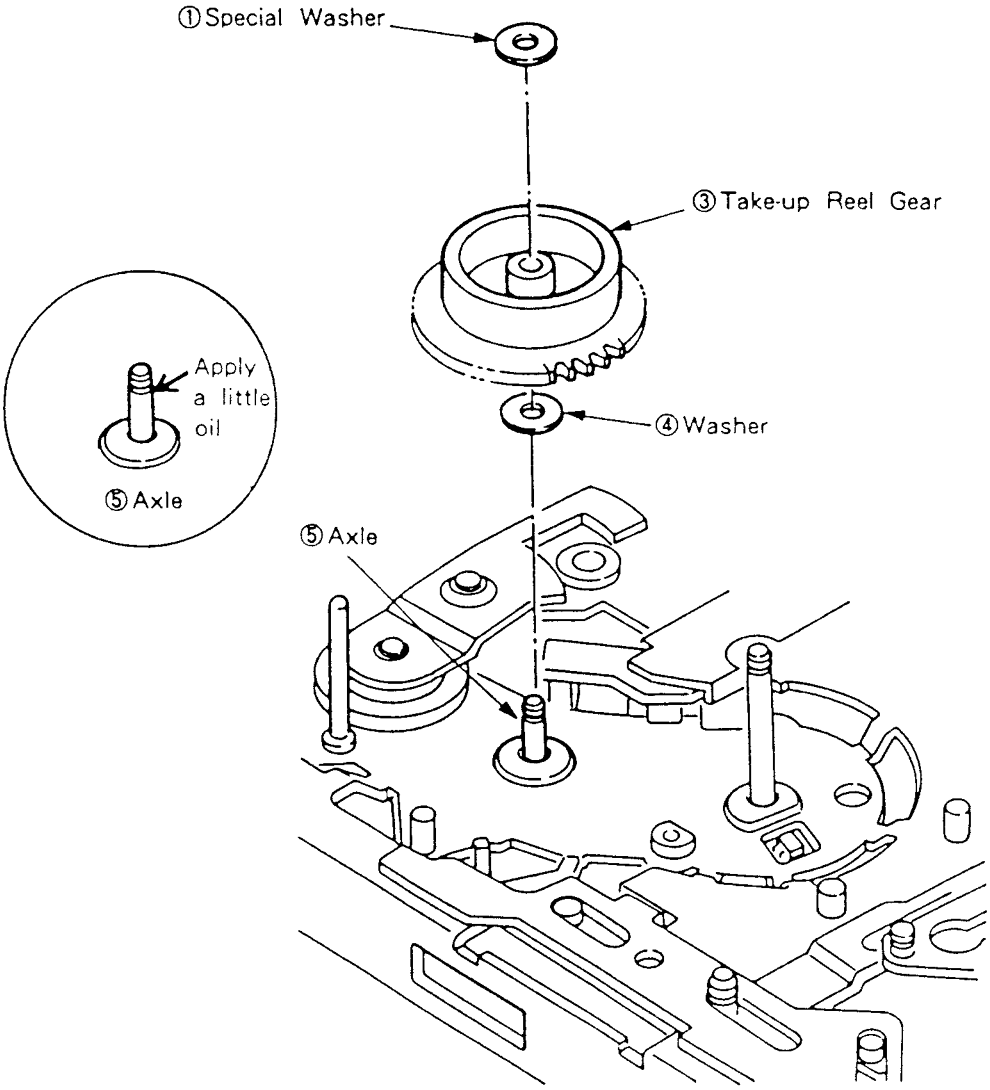


Fig. 5-8-3. Take-up Reel Gear

5-8-4. Reel Pulley and Friction Gear Ass'y (See Fig. 5-8-4.)

1. Removal

1) Remove the two screws ①, then remove the PULLEY BRACKET ②.
2) Remove the REEL DRIVE BELT ③.
3) Remove the special washer ④, then remove the REEL PULLEY ⑤.
4) Remove the special washer ⑥, then remove the FRICTION GEAR ASS'Y ⑦ and the washer ⑧.

2. Remounting

1) Apply one drop of oil to the parts of axles ⑨ and ⑩ indicated with an arrow.
2) Mount the washer ⑧ and the FRICTION GEAR ASS'Y ⑦ onto the axle ⑨.
3) Mount the special washer ⑥ onto the axle ⑨.
4) Mount the REEL PULLEY ⑤ onto the axle ⑩.
5) Mount the special washer ④ onto the axle ⑩.
6) Set the REEL DRIVE BELT ③.
7) Mount the PULLEY BRACKET ② with the two screws ①.

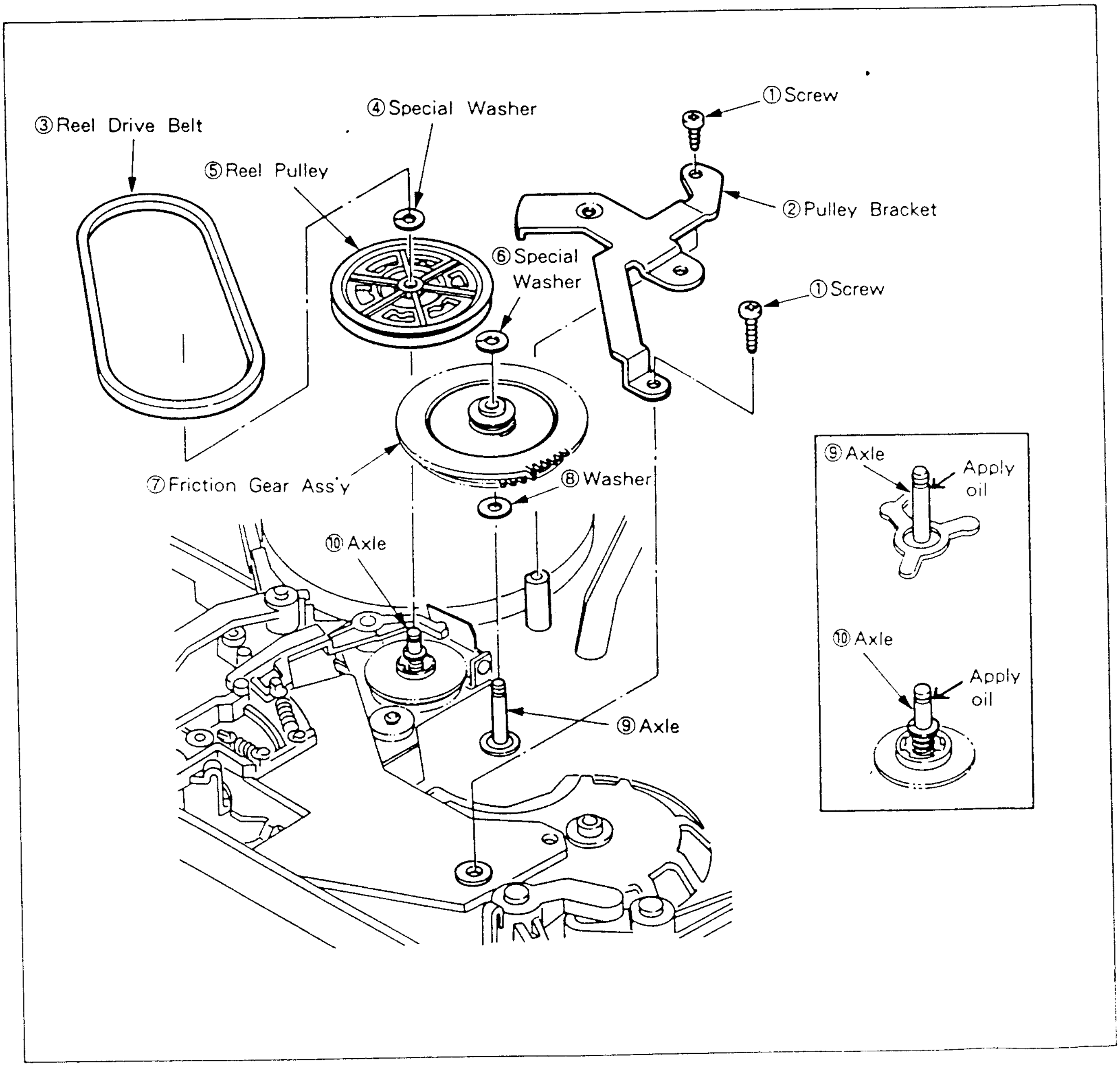

③Reel Drive Belt
④Special Washer
①Screw
⑤Reel Pulley
②Pulley Bracket
⑥Special Washer
①Screw
⑦Friction Gear Ass'y
⑧Washer
⑩Axle
⑨Axle
⑨Axle
Apply oil
⑩Axle
Apply oil

Fig. 5-8-4. Reel Pulley & Friction Gear

5-8-5. COMPL Clutch (See Fig. 5-8-5.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the PULLEY BRACKET, the REEL DRIVE BELT and the REEL PULLEY as instructed in 5-8-4.
3) Remove the screw ①, then remove the COMPL MC-4 ②.
4) Remove the two screws ③, then remove the COMPL CLUTCH ④.

2. Remounting

1) Mount the COMPL CLUTCH ④ with the two screws ③, aligning it with the protuberance ⑤.
2) After inserting the CN831 (COMPL MC-4) into the CN801 (COMPL MC-1), mount the COMPL MC-4 with the screw ①.
3) Mount the REEL PULLEY, the REEL DRIVE BELT and the PULLEY BRACKET as instructed in 5-8-4.
4) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

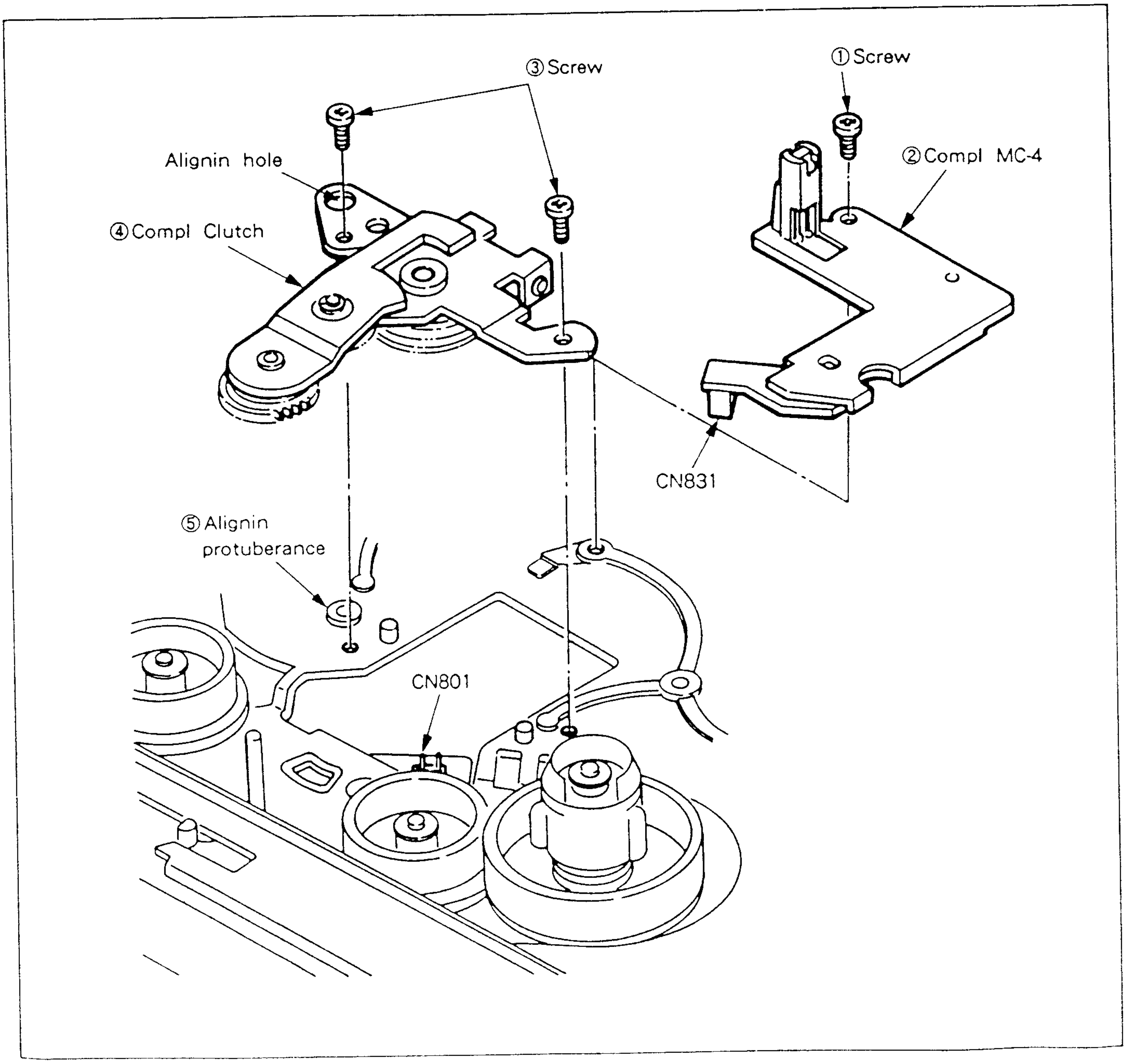

③Screw
①Screw
Alignin hole
②Compl MC-4
④Compl Clutch
CN831
⑤Alignin protuberance
CN801

Fig. 5-8-5. Compl Clutch

5-9. CAPSTAN MOTOR (See Fig. 5-9-1.)

1. Removal

1) Remove the CAPSTAN BRAKE ASS'Y as instructed in 5-7-4.
2) Remove the CAPSTAN MOTOR ⑥ connector.
3) Remove the REEL DRIVE BELT ② from the CAPSTAN MOTOR PULLEY ①.
4) Remove the two screws ④ fixing the COMPL CASSETTE MECHANISM TOP BOARD ③, then slide the TOP BOARD ③ backward.
5) Remove the three screws ⑤, then remove the CAPSTAN MOTOR ⑥.

Note : Take care not to scratch or soil the capstan axle.

2. Remounting

1) Mount the CAPSTAN MOTOR ⑥ with the three screws ⑤.
2) Connect the CAPSTAN MOTOR ⑥ connector.
3) Mount the TOP BOARD ③ with the two screws ④.
4) Fit the REEL DRIVE BELT ② around the CAPSTAN MOTOR PULLEY ① and the REEL PULLEY ⑦.
5) Mount the CAPSTAN BRAKE ASS'Y as instructed in 5-7-4.

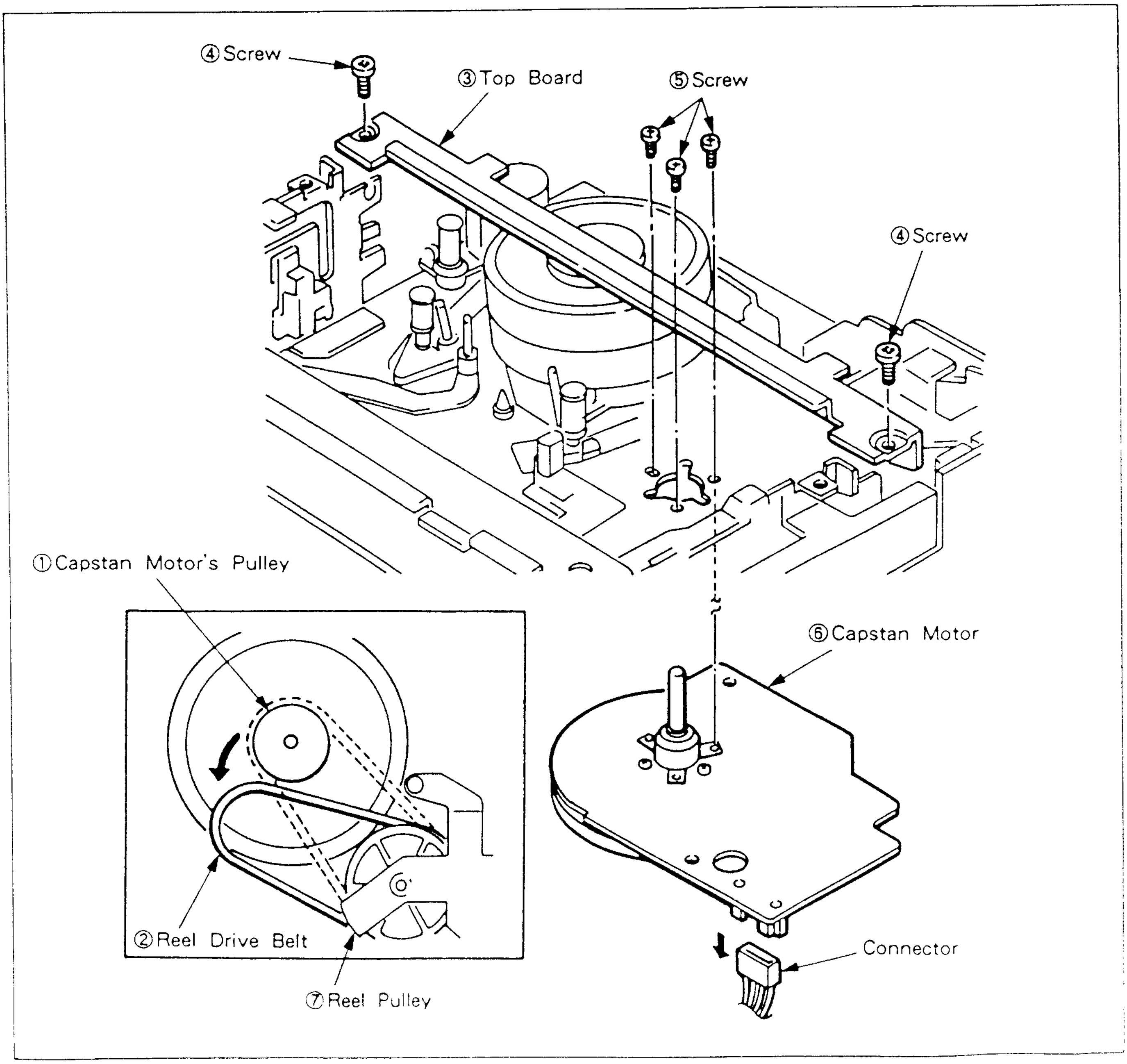

④Screw
③Top Board
⑤Screw
④Screw
①Capstan Motor's Pulley
⑥Capstan Motor
②Reel Drive Belt
Connector
⑦Reel Pulley

Fig. 5-9-1. Capstan Motor

5-10. FIXED GUIDE, FE HEAD LEVER ASS'Y

5-10-1. S-Side Fixed Guide and FE Lever Ass'y (See Fig. 5-10-1.)

1. Removal

1) Remove the SP NUT ①, then remove the SP washer ② (upper), the GUIDE PIPE ③, the SP washer ② (lower) and the SPRING COIL ④, in that order.
2) Remove the SPRING COIL ⑤.
3) Remove the FTE HEAD connector.
4) Remove the special washer ⑥, then remove the FE HEAD LEVER ASS'Y ⑦.

2. Remounting

1) After mounting the FE LEVER ASS'Y ⑦ onto the axle ⑧, mount the special washer ⑥.
2) Hook the SPRING COIL ⑤ between the chassis notch ⑨ and the FE LEVER ASS'Y hook ⑩.
3) Connect the SPRING COIL ④, the SP washer ② (lower), the GUIDE pipe ③, the SP washer ② (upper) and the SP NUT ① to the axle ⑧, in that order.
4) Connect the connector to the FTE HEAD.
5) Perform height adjustment of the fixed guide (S) as instructed in 6-4.

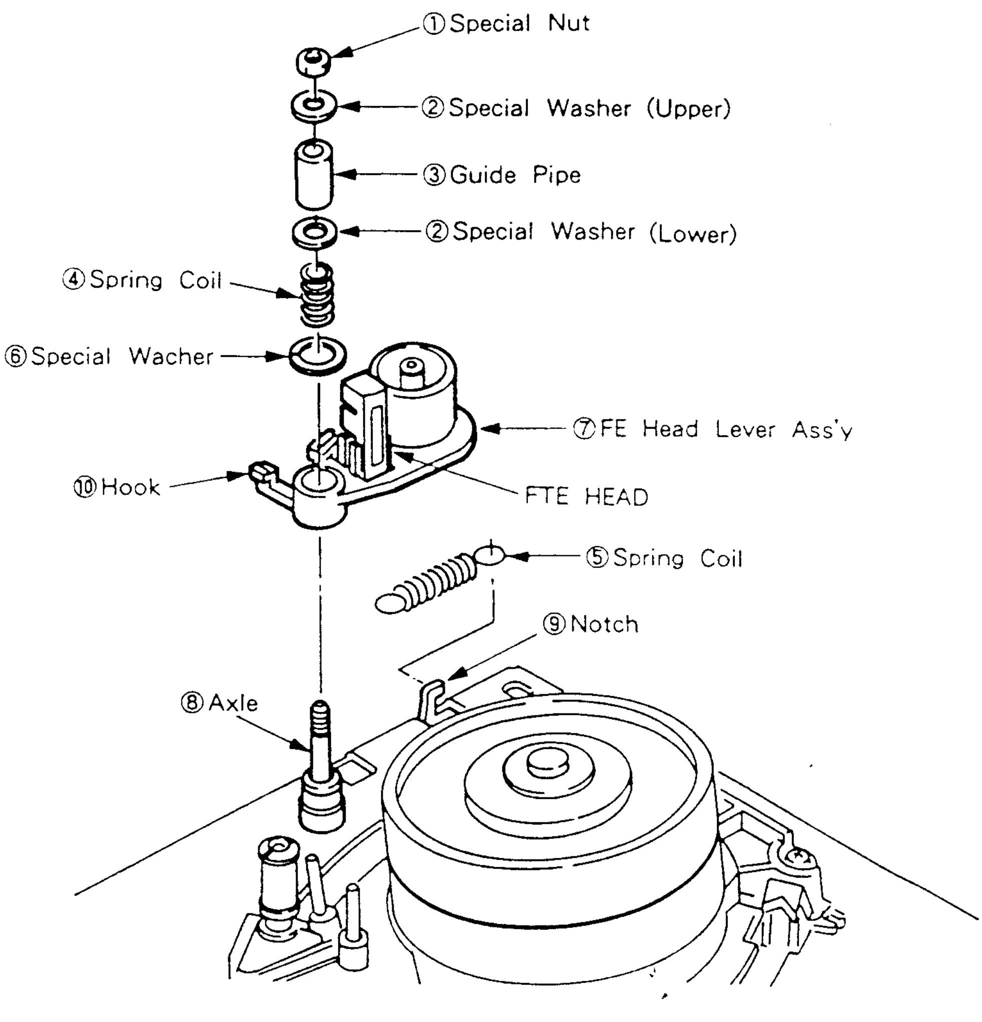

①Special Nut
②Special Washer (Upper)
③Guide Pipe
②Special Washer (Lower)
④Spring Coil
⑥Special Wacher
⑦FE Head Lever Ass'y
⑩Hook
FTE HEAD
⑤Spring Coil
⑨Notch
⑧Axle

Fig. 5-10-1. Fixed Guide (S) & FE Lever Ass'y

5-10-2. Impedance Roller, FTE Head (See Fig. 5-10-2.)

1. Removal

1) Remove the FTE HEAD (full track erase head) ① connector.
2) Remove the special washer ②, then remove the IMPEDANCE ROLLER ③ and the washer ④.
3) Open the hook ⑤ a little and remove the FTE HEAD ①.

Note : Take care not to open the hook too much, otherwise it may be deformed or broken.

2. Remounting

1) Mount the FTE HEAD ① onto the FE HEAD LEVER ASS'Y ⑥. Confirm that the hook ⑤ is hooked to the FTE HEAD ①.
2) Mount the washer ④ and the IMPEDANCE ROLLER ③, in that order, onto the axle ⑦, then mount the special washer ②.
3) Connect the connector to the terminal of the FTE HEAD ①.

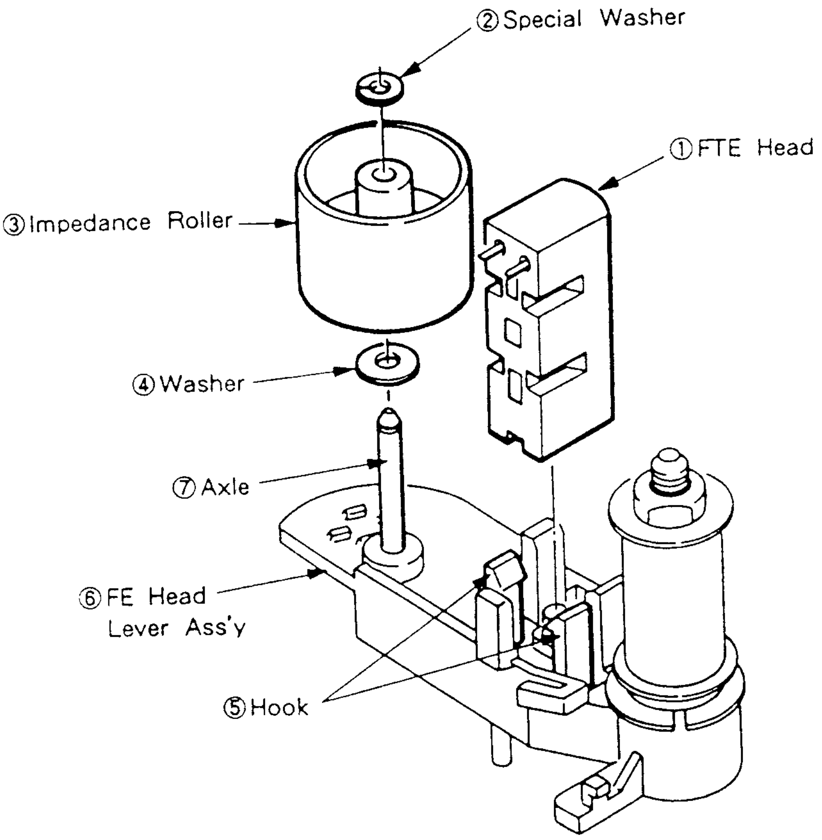

②Special Washer
①FTE Head
③Impedance Roller
④Washer
⑦Axle
⑥FE Head Lever Ass'y
⑤Hook

Fig. 5-10-2. **Impedance Roller & FTE Head**

5-10-3. Fixed (T) Guide (See Fig. 5-10-3.)

1. Removal

1) Remove the CAP ①.
2) Remove the SP NUT ②, then remove the SP washer ③ (upper), the GUIDE PIPE ④, the SP washer ③ (lower) and the SPRING COIL ⑤, in that order.

Note : Shape of the CAP differ from drawing in the figure depending on the model.

2. Remounting

1) Mount the SPRING COIL ⑤, the SP washer ③ (lower), the GUIDE PIPE ④, the SP washer ③ (upper) and the SP NUT ②, in that order, to the axle ⑥.
2) Mount the CAP ① onto the axle ⑥.
3) Perform height adjustment of the fixed guide (T) as instructed in 6-4.

Note : In some models, the CAP ① is attached to the SPRING GUIDE ⑦. In this case, place the SPRING GUIDE ⑦ into the guide hole ⑧ of the GUIDE BRACKET screwed to the COMPL CASSETTE MECHANISM as shown in Fig. A.

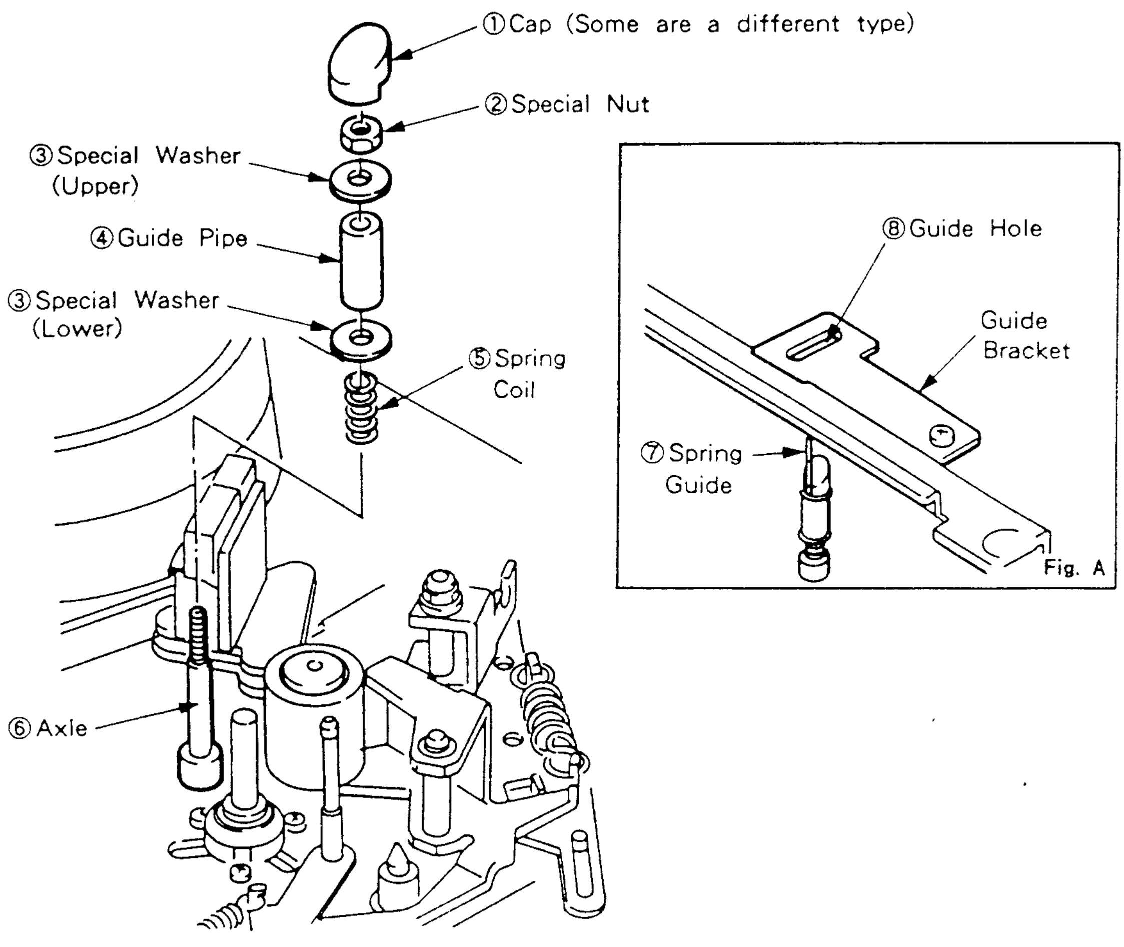

①Cap (Some are a different type)
②Special Nut
③Special Washer (Upper)
④Guide Pipe
③Special Washer (Lower)
⑤Spring Coil
⑥Axle
⑧Guide Hole
Guide Bracket
⑦Spring Guide
Fig. A

Fig. 5-10-3. Fixed Guide (T)

5-11. DRUM SECTION

5-11-1. Drum Motor (rotor, stator) (See Fig. 5-11-1.)

1. Removal

1) Remove the screw ①, then remove the CYLINDER EARTH ASS'Y ②.
2) Remove the two screws ③, then remove the ROTOR ④.
3) Remove the STATOR board connector.
4) Remove the three screws ⑤, then remove the STATOR ⑥.

2. Remounting

1) Mount the STATOR ⑥ with the three screws ⑤.
2) While aligning the ROTOR oval hole ⑦ with the ROTOR DISK hole ⑧, mount the ROTOR with the two screws ③.
3) Insert the connector ⑩.
4) While aligning the CYLINDER EARTH ASS'Y ② protuberance with the chassis hole ⑨, mount it with the screw ①.

Note 1 : Use a torque driver (VHJ-0014) for mounting the STATOR ⑥ and the ROTOR ④. Set fastening torque to 3kg-cm.

Note 2 : When the drum unit has been replaced, perform a tape path adjustment as instructed in 6-4. and perform a CH-1/CH-2 switching position adjustment of the servo circuit.

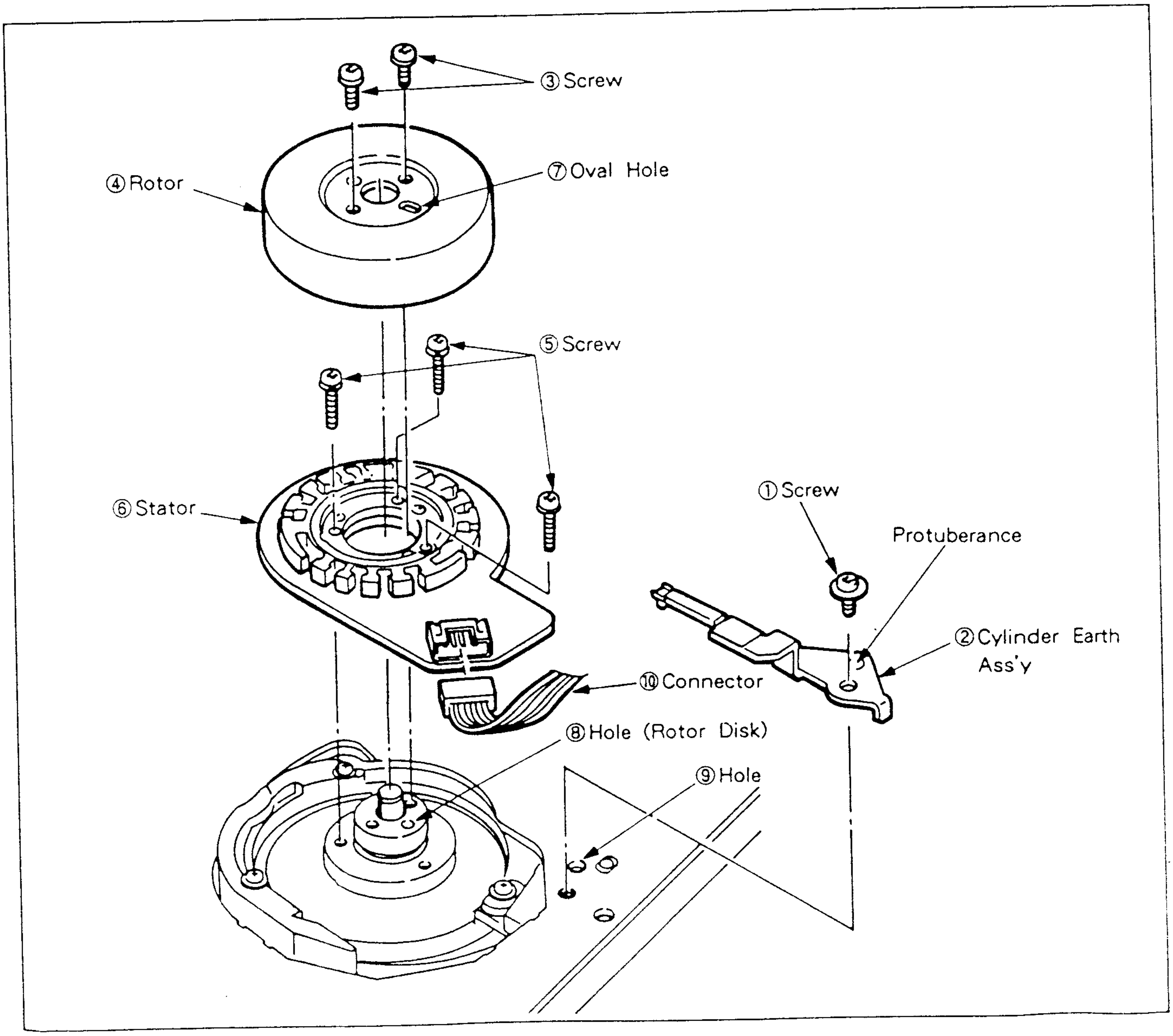

③Screw
④Rotor
⑦Oval Hole
⑤Screw
⑥Stator
①Screw
Protuberance
②Cylinder Earth Ass'y
⑩Connector
⑧Hole (Rotor Disk)
⑨Hole

Fig. 5-11-1. Drum Motor

5-11-2. Drum Unit (See Fig. 5-11-2.)

1. Removal

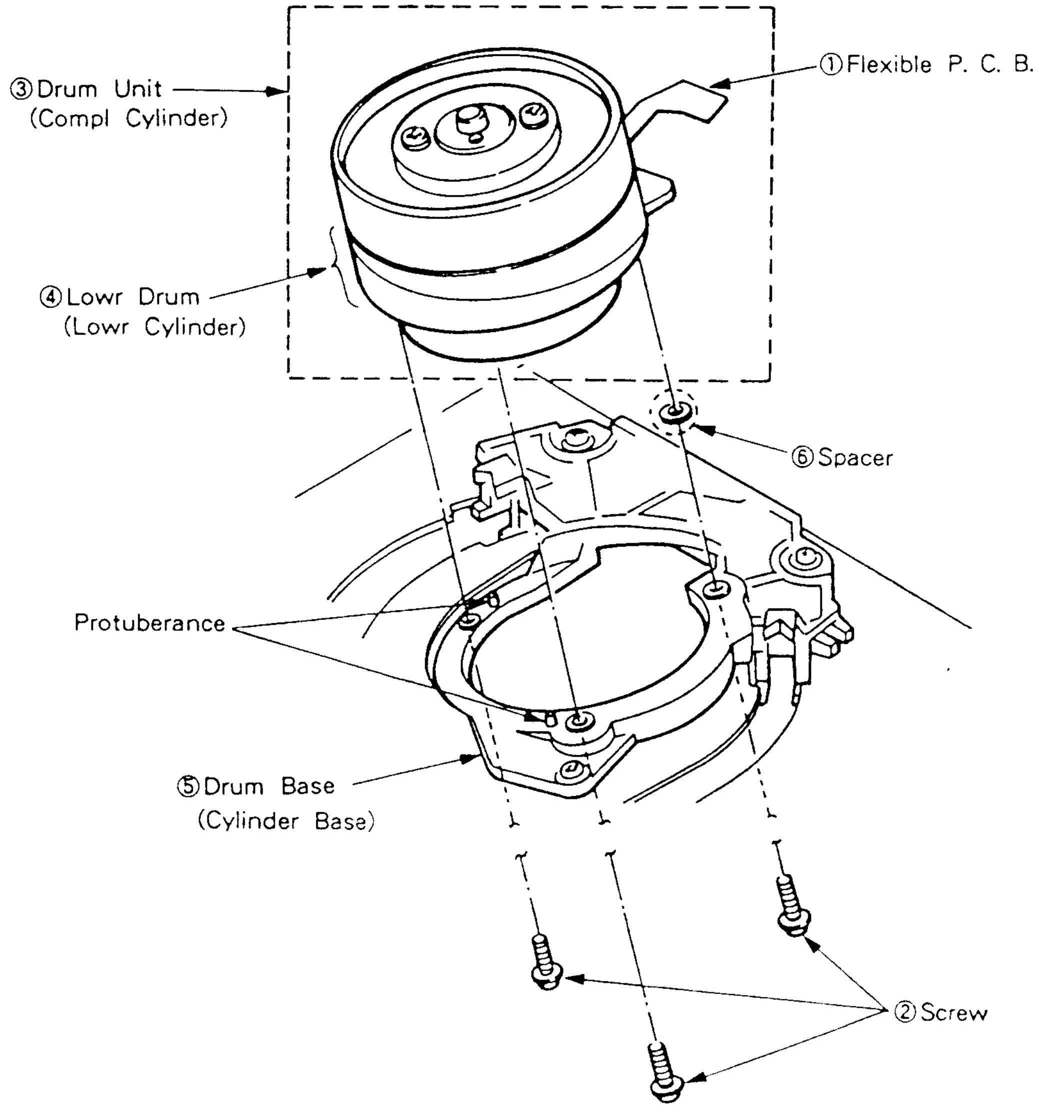
1) For some models with the board located above the upper drum, remove the board.
2) Remove the flexible P.C.B. ① from the COMPL VP-1 (take care not to pull the flexible P.C.B. in the upward direction).
3) Remove the LOAD RACK only, as instructed in 5-4-1.
4) Remove the three screws ②, then remove the drum unit ③.

Note 1 : A spacer ⑥ is sometimes inserted between the LOWER DRUM (LOWER CYLINDER) ④ and the DRUM BASE (CYLINDER BASE) ⑤. In this case, put it back in its original position when remounting the drum.

Note 2 : When removing and remounting the drum unit, handle it carefully to protect it from scratches and dirt.

2. Remounting

1) While aligning the drum unit ③ to the protuberance, mount it to the drum base (CYLINDER BASE) ⑤ with the three screws ②.
2) Mount the ROAD RACK as instructed in 5-4-1.
3) Insert the flexible P.C.B. into the COMPL VP-1.
4) Clean the drum unit.
5) Perform the tape path adjustment as instructed in 6-4. and perform the CH-1/CH-2 switching position adjustment of the servo circuit.



③Drum Unit
(Compl Cylinder)
①Flexible P. C. B.
④Lowr Drum
(Lowr Cylinder)
⑥Spacer
Protuberance
⑤Drum Base
(Cylinder Base)
②Screw

Fig. 5-11-2 Drum Unit (Compl Cylinder)

2. **Remounting (See Fig. 5-11-6.)**

1) Confirm that surfaces where the flywheel and the upper drum (UPPER CYLINDER) are engaged or make contact portion are free from scratches and dirt.
2) The code name ① of the drum is printed on the video head side of the upper drum ⑤ SP CH-1 (channel A, plus azimuth). The code name ① is set with in the rotary transformer terminal round hole side ② position of lower drum (LOWER CYLINDER), so that the two screw holes ③ of the upper drum are aligned with the two screw holes ④ of the flywheel. (Refer to 3. Recognizing the SP CH-1 Head side).
3) In case the RE (ROTARY ERASE) HEAD is attached to the upper drum, pass the lead wires through the lead wire hole. '(See Fig.5-11-4.)
4) While keeping the upper drum ⑤ parallel to the lower drum (LOWER CYLINDER) ⑧, insert it completely into the flywheel.
5) Temporarily tighten the two screws ⑦ alternately a little at a time, then tighten them to a torque of 6kg-cm using a torque driver (VHJ-0014) and a 3mm bit (VHJ-0045).
6) In case the RE head is attached to the upper drum ⑤, solder the lead wires to the P.C. board. Solder the red lead wire to the R terminal, and the yellow lead wire to the Y terminal.

Note : When the upper drum has been replaced, perform a tape path adjustment as instructed in 6-4. and CH-1/CH-2 switching position adjustment of the servo circuit.

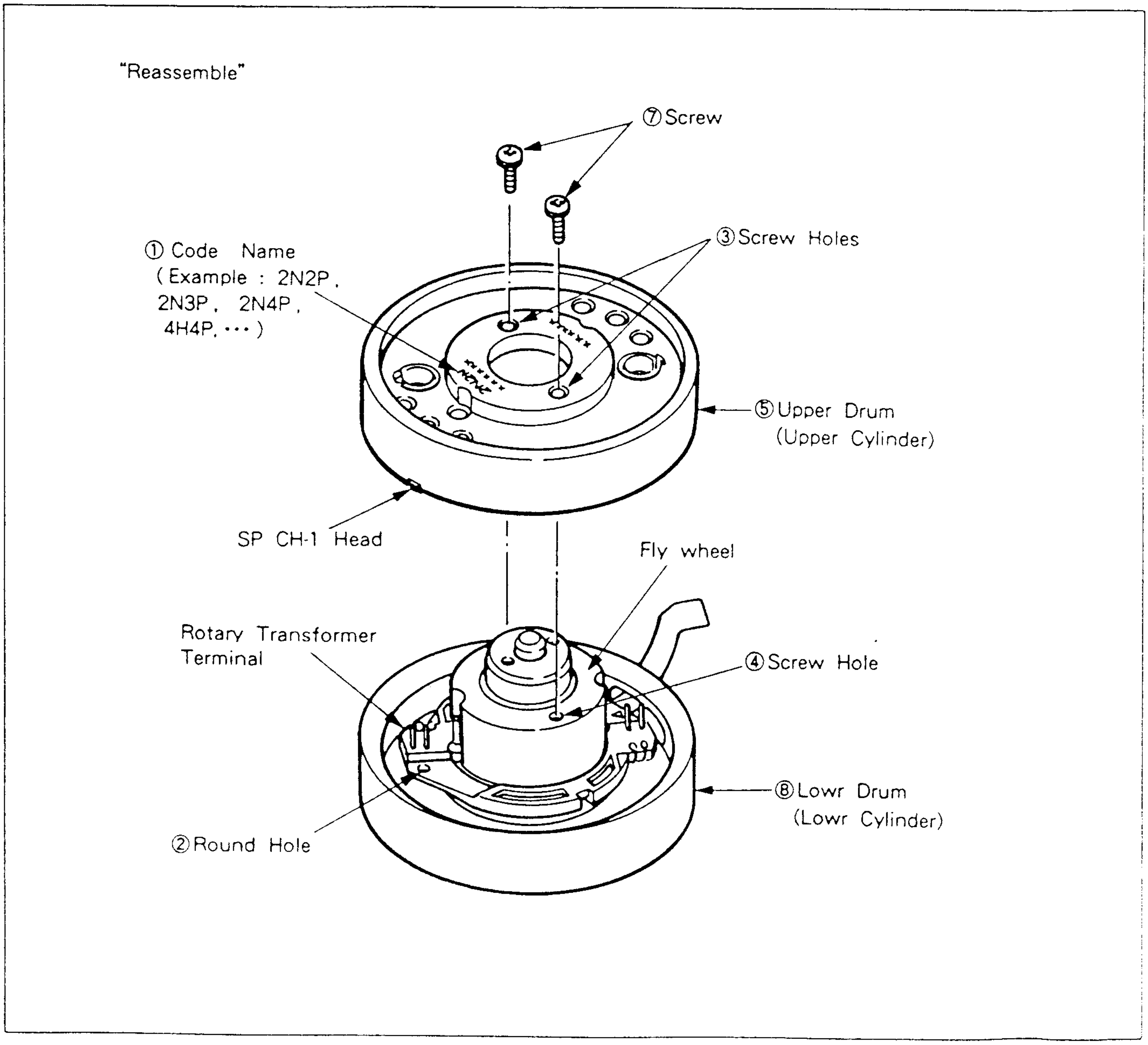
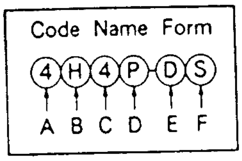

"Reassemble"
⑦Screw
① Code Name
(Example : 2N2P, 2N3P, 2N4P, 4H4P, ···)
③Screw Holes
⑤Upper Drum
(Upper Cylinder)
SP CH-1 Head
Fly wheel
Rotary Transformer Terminal
④Screw Hole
⑧Lowr Drum
(Lowr Cylinder)
②Round Hole

Fig. 5-11-6

3. **Recognizing the SP CH-1 Head Side**

No playback picture can be obtained if the video head is not wired as a pair with the rotary transformer located inside the lower drum rotating section. Therefore, mounting position should be matched when mounting the upper drum. In the P88 mechanism series, the code name of the drum is printed on the SP CH-1 (CH-A, plus azimuth) side as a mark for mounting the upper drum. (See Fig. 5-11-7.) This code name differs according to the drum type, but its basic form is as follows :


Code Name Form
4 H 4 P - D S
A B C D E F

A = Number of head bases
B = "N" for normal audio
"H" for HI-FI audio
C = Number of heads
D = TV system ("N" or "P")
EF = Code for detailed classification. Depending on drum type, it can also be just one character, or a blank space.

Examples of Detailed Classification Codes
V = Head with level difference
D = Compatible with digital units
S = SVHS-compatible

Examples of Code Names
2N2P, 2N2P-L, 2N2P-V, 2N2P-D, 2N3P, 2N4P, 4H4P, 4H4P-D

Moreover, there is a round hole with marking purposes on the SP CH-1 (CH-A, plus azimuth) side of the lower drum rotary transformer terminal. As shown in Fig. 5-11-8, there are two types of rotary transformer terminals (the number of pins differs according to the number of heads).

Note : When ordering parts such as drums (CYLINDERS), do not use the code names ; always refer to the parts list and order with the specified part numbers.

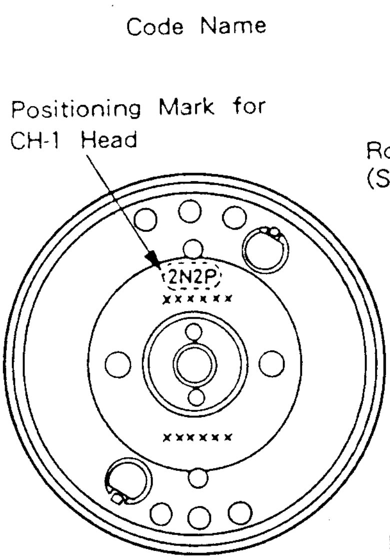

Code Name
Positioning Mark for CH-1 Head
2N2P
xxxxxx
xxxxxx

Fig. 5-11-7. Upper Drum

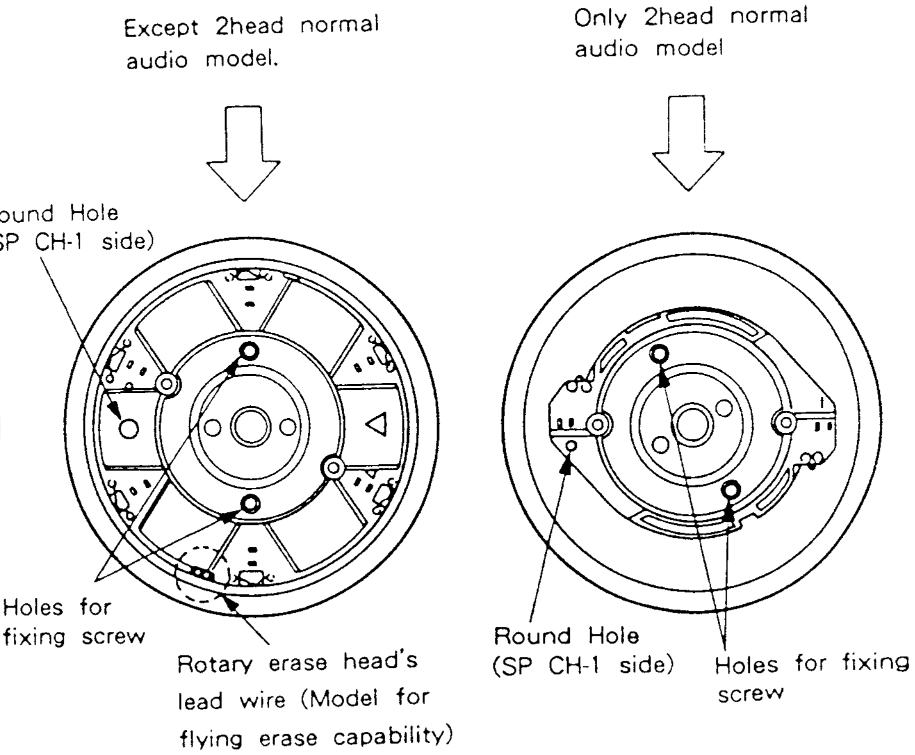
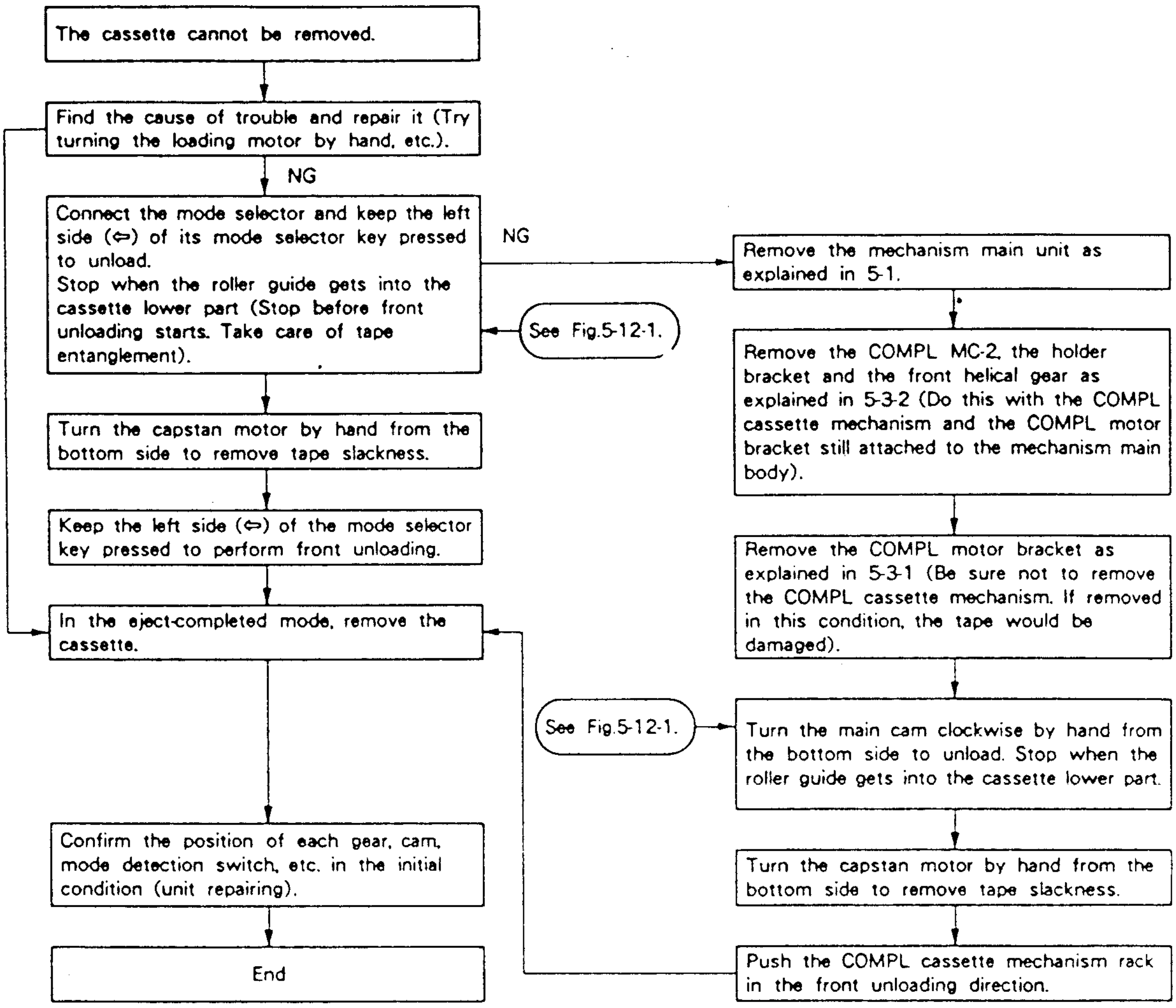
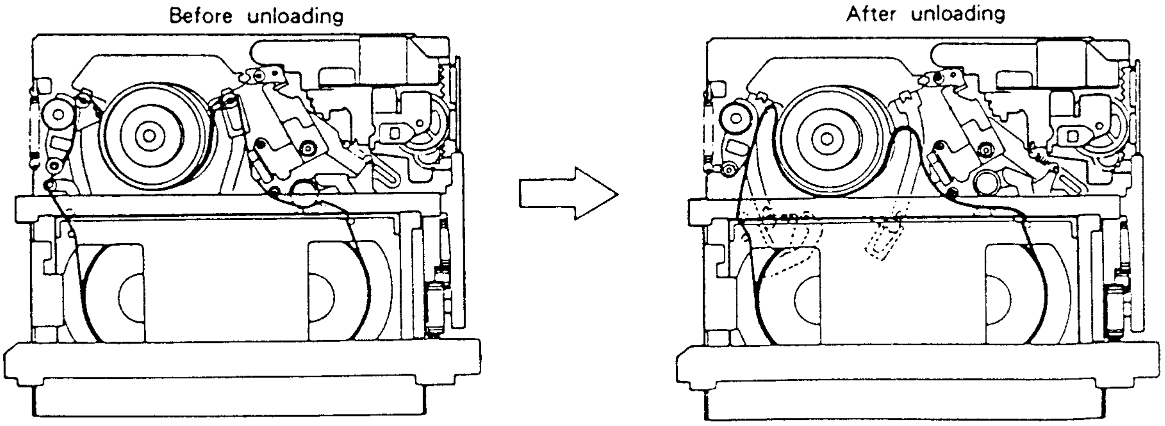

Except 2head normal audio model.
Only 2head normal audio model
Round Hole (SP CH-1 side)
Holes for fixing screw
Rotary erase head's lead wire (Model for flying erase capability)
Round Hole (SP CH-1 side)
Holes for fixing screw

Fig. 5-11-8. Lower Drum

5-12. HOW TO PROCEED WHEN THE CASSETTE CANNOT BE REMOVED


The cassette cannot be removed.
Find the cause of trouble and repair it (Try turning the loading motor by hand, etc.).
NG
Connect the mode selector and keep the left side (⇦) of its mode selector key pressed to unload.
Stop when the roller guide gets into the cassette lower part (Stop before front unloading starts. Take care of tape entanglement).
See Fig.5-12-1.
Turn the capstan motor by hand from the bottom side to remove tape slackness.
Keep the left side (⇦) of the mode selector key pressed to perform front unloading.
In the eject-completed mode, remove the cassette.
Confirm the position of each gear, cam, mode detection switch, etc. in the initial condition (unit repairing).
End
NG
Remove the mechanism main unit as explained in 5-1.
Remove the COMPL MC-2, the holder bracket and the front helical gear as explained in 5-3-2 (Do this with the COMPL cassette mechanism and the COMPL motor bracket still attached to the mechanism main body).
Remove the COMPL motor bracket as explained in 5-3-1 (Be sure not to remove the COMPL cassette mechanism. If removed in this condition, the tape would be damaged).
See Fig.5-12-1.
Turn the main cam clockwise by hand from the bottom side to unload. Stop when the roller guide gets into the cassette lower part.
Turn the capstan motor by hand from the bottom side to remove tape slackness.
Push the COMPL cassette mechanism rack in the front unloading direction.


Before unloading
After unloading

Perform unloading using the mode selector.

First rotate the capstan motor by hand from the bottom to take-up the tape slack, and perform front-unloading using the mode selector.

Fig. 5-12-1

6. MECHANISM ADJUSTMENT

6-1. OPERATING THE MECHANISM WITH NO CASSETTE INSERTED (See Fig. 6-1-1.)

1) Attach black vinyl tape to the T. END and T. TOP sensors to prevent light from entering.
2) Push the TRAY LOCK LEVER in the direction of the arrow to maintain the unlocked condition. Release the lever just before the TRAY starts moving down.
3) In this condition, operation is possible in every mode. However, the following procedures are necessary to operate the unit in the REC, REW and R-SEARCH modes.

REC mode :	Push the SAFETY SW LEVER to turn the SAFETY SWITCH (Erasure Prevention Switch) ON, then press the REC button. If the SAFETY SWITCH is not turned ON, the unit will enter the EJECT mode.
REW/R-SEARCH :	After pressing the REW button, turn the TAKE-UP REEL ASS'Y by hand. Otherwise, the reel sensor will operate, setting the INITIAL mode after 2 to 3 seconds.

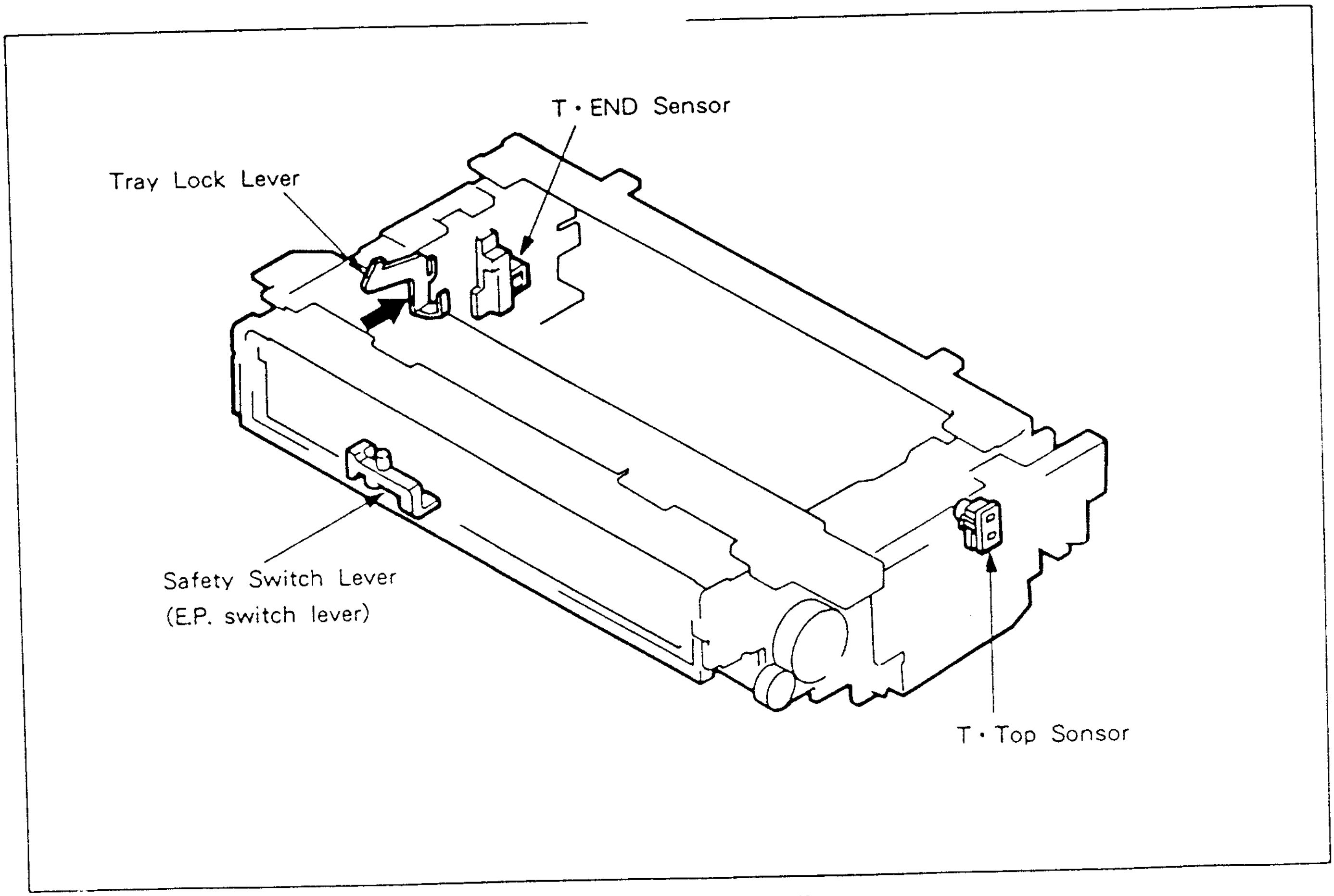


Fig. 6-1-1. Preparations for Adjustment

6-2. REEL TABLE HEIGHT ADJUSTMENT AND TORQUE CHECK

6-2-1. Reel Table Height (See Fig. 6-2-1.)

If the SUPPLY REEL ASS'Y or the TAKE-UP REEL ASS'Y is raplaced, it will be necessary to adjust the REEL TABLE height.

(1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1 of Service Manual.
(2) Attach the master plane (H-7099-279-H) and reel disc height jig (H-7099-038-H) in the direction of the arrows.
(3) Confirm that, when the gauge stops, the REEL TABLEs are not in contact with surface A of the plate and side of the REEL TABLEs are in contact with surface B.
(4) If the REEL TABLE is in contact with surface A, remove a spacer and check again.
(5) If the REEL TABLE is not in contact with surface B, add a spacer and check again.
(6) Remove the master plane.
(7) Set the EJECT mode with the mode selector.
(8) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1 of Service Manual.

Note:

- Adjust the reel table height by adding or removing spacers(0.13t, 0.25t, 0.3t, 0.4t and 0.5t)as appropriate so that the height meets the specifications. Use the same method for both the TAKE-UP REEL TABLE and the SUPPLY REEL TABLE.
(The 0.5t washer is included as the standard washer for the SUPPLY REEL ASS'Y. The 0.4t washer is included as the standard washer for the TAKE-UP REEL ASS'Y.)
- If the height of the reel table is not within the specified value, the tape edge might be damaged as a result, or the tape path adjustment might not be possible to make.

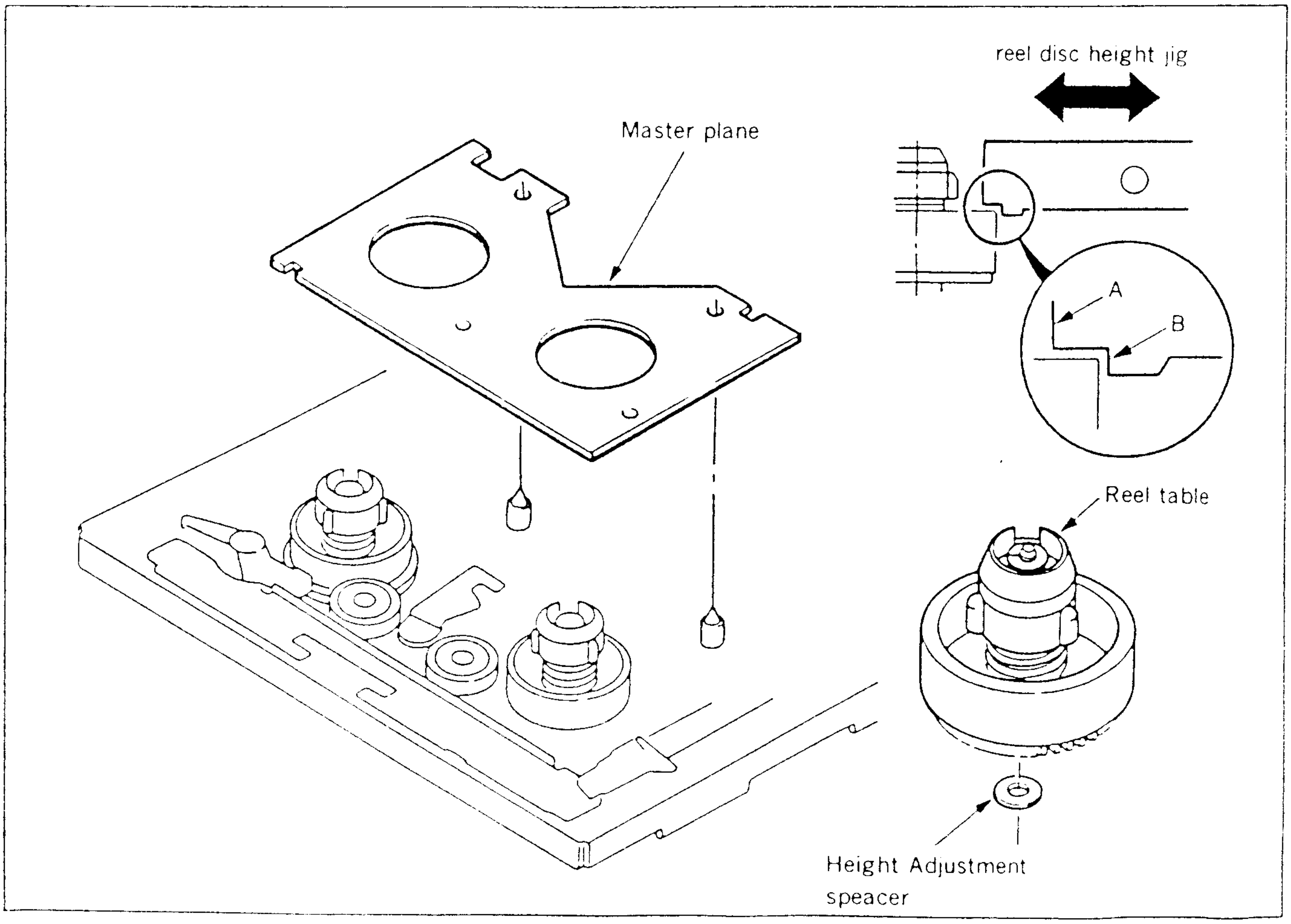


Fig. 6-2-1. Reel Table Height Adjustment

6-2-2. Torque Check (See Fig. 6-2-2.)

1) Set the unit to operating condition without a cassette inserted as instructed in 6-1.
2) Measure the SUPPLY REEL TABLE torque in the REW mode, and confirm that it is 600gcm or more. Perform this measurement keeping the torque gauge in a fixed position with your hand (locked torque).
3) Measure the TAKE-UP REEL TABLE torque in the F.FWD mode, and confirm that it is 600gcm or more (locked torque).
4) Measure the TAKE-UP REEL TABLE torque in the playback mode (SP tape speed), and confirm that it is within 80 through 150gcm (locked torque).
5) After confirming that torque readings are within the specifications for each mode, check the following :
   - ⓐ Dirt on the capstan motor and the REEL PULLEY groove.
   - ⓑ Deterioration of the REEL DRIVE BELT.
   - ⓒ Deterioration of the FRICTION GEAR ASS'Y felt (torque during playback).
   - ⓓ Wear and damage of the COMPL CLUTCH MECHANISM and the reel drive system gears.

Note : Items ⓑ, ⓒ and ⓓ require replacement if found defective.

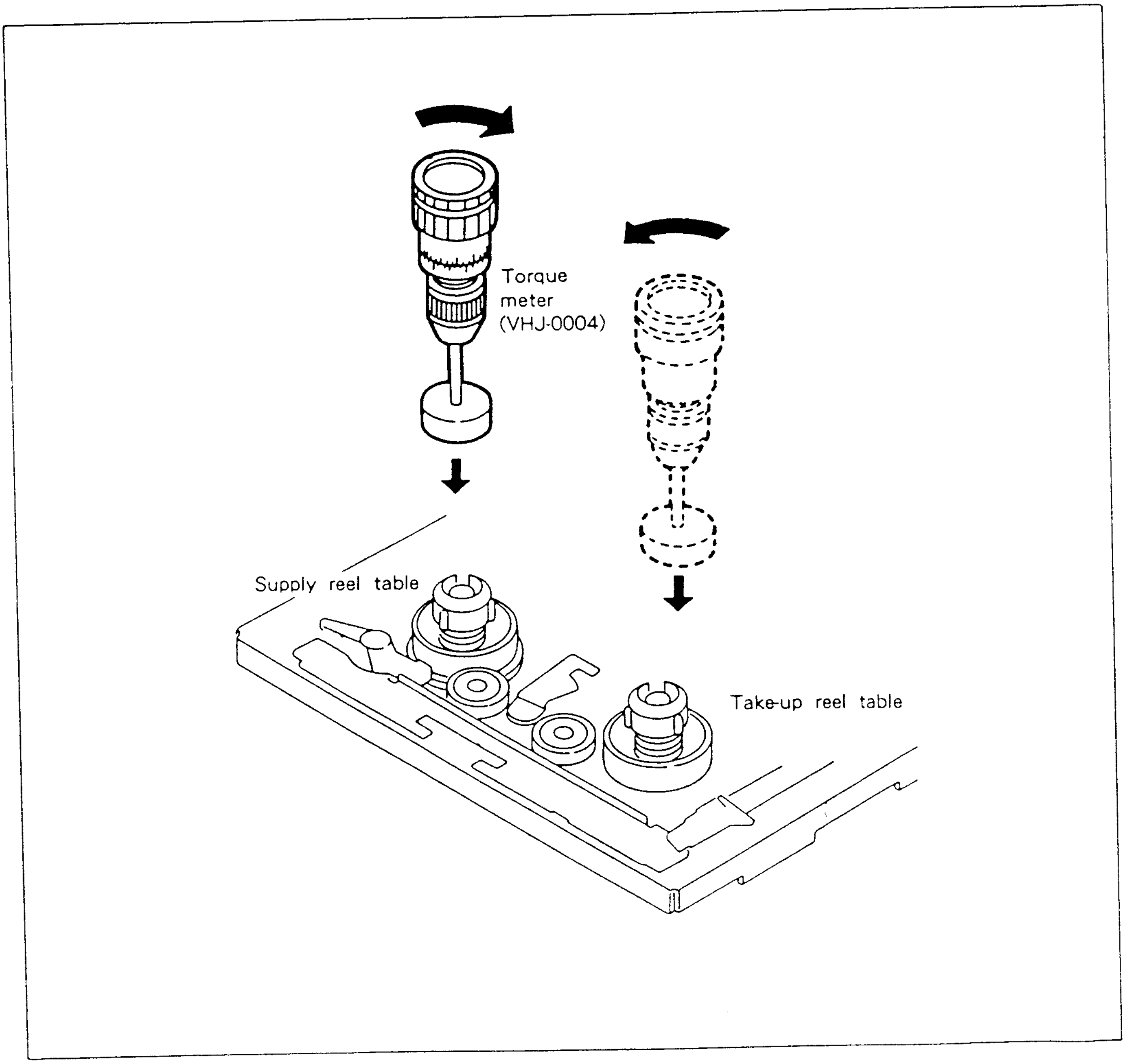


Fig. 6-2-2 Checking REW/FF/PLAY Torque

6-3. TENSION POLE (BACK TENSION GUIDE) POSITION ADJUSTMENT AND BACK TENSION TORQUE CHECK

6-3-1. Tension Pole (Back Tension Guide) Position Adjustment (See Fig. 6-3-1.)

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1 of Service Manual.
2) Set the PLAY mode with the mode selector (VHJ-0050)
3) Confirm that the space between the end of chassis and the Tension arm is from 4mm to 6mm.
4) In case the tension pole is not withim 4-6mm, adjust it by loosening the screw ④ a little and changing the mounting position of the BAND HOLDER ⑤ in the direction of the arrow Ⓐ.
5) Set the EJECT mode with the mode selector.
6) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1 of Service Manual.
7) Confirm that back tension torque is within 42± 5gcm, as instructed in 6-3-2 below.

6-3-2. Back Tension Torgue Chack (See Fig. 6-3-1.)

1) Attach the cassette torquemeter (VHJ-0016) and set the PLAY mode.
2) Confirm that back tension torque is within 42± 5gcm.
3) In case back tension torque dose not meet the above specification, proceed as follows:

ⓐ Clean the portion where the brake band (BAND HOLDER ASS'Y) ⑦ of the SUPPLY REEL ASS'Y ⑥ makes contact.

ⓑ Confirm that the brake band of the BAND HOLDER ASS'Y ⑦ does not make wear and that it is clean. If wear or dirt is found, replace the band holder assembly ⑦ as instructed in 5-7-3 of Service Manual.

ⓒ Raplace the TENSION LEVER ASS'Y SPRING COIL ⑧.

Note : Always follow procedures in 6-3-1. Tension Pole Position Adjustment after performing ⓐ, ⓑ and ⓒ.

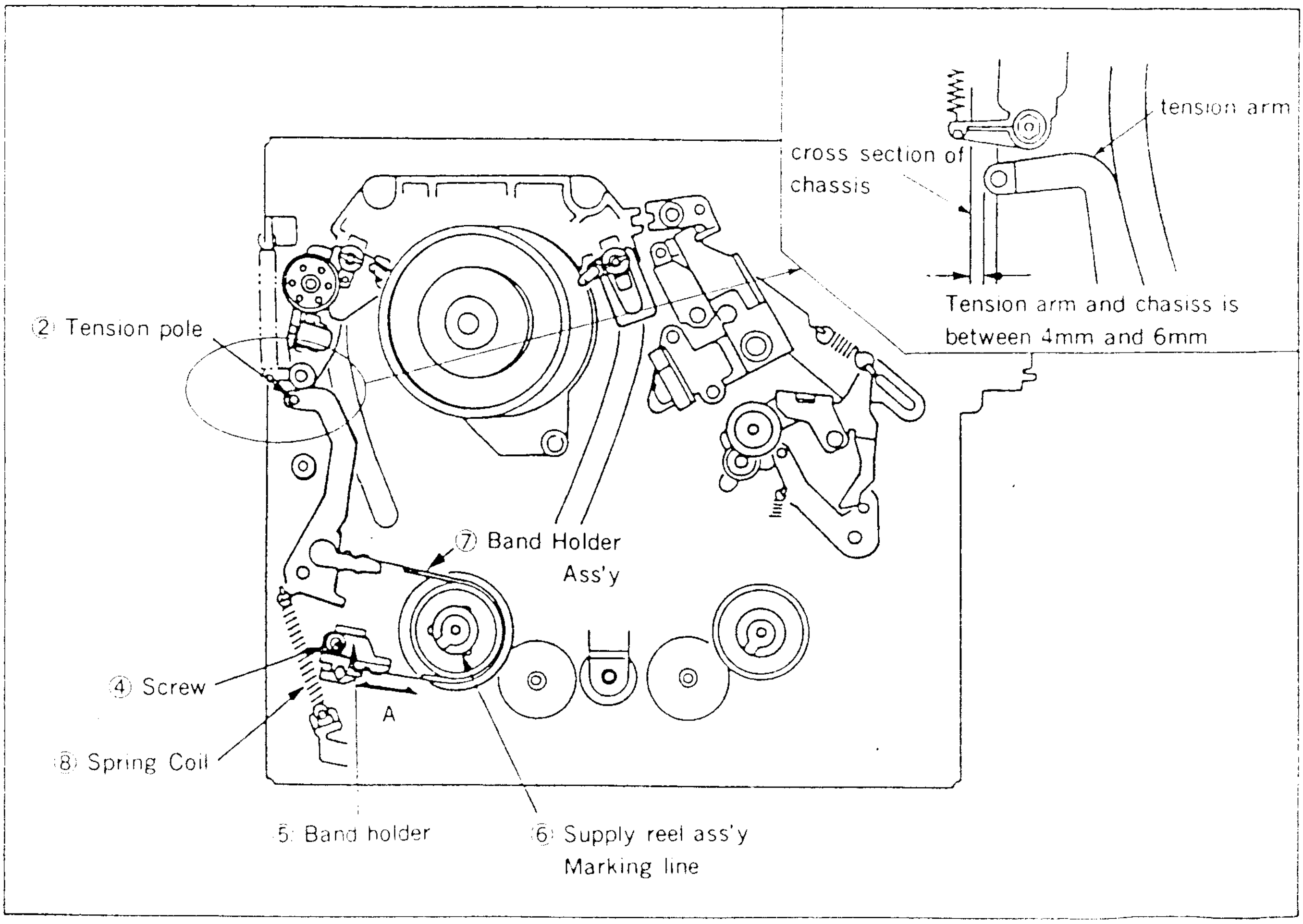

tension arm
cross section of chassis
Tension arm and chasiss is between 4mm and 6mm
② Tension pole
⑦ Band Holder Ass'y
④ Screw
A
⑧ Spring Coil
⑤ Band holder
⑥ Supply reel ass'y
Marking line

Fig. 6-3-1. Tension Pole Positioning Adjustment

6-4. TAPE PATH ADJUSTMENT

The tape path mechanism is precisely adjusted at the factory. Normally no readjustment is required, but checking and/or adjustment is necessary when parts of the tape path mechanism among those shown in the figure below (See Fig. 6-4-1.) have been removed or replaced after a long period of use.
This operation consists of adjusting the various guides so that the tape drawn out from the supply reel runs smoothly along the DRUM (CYLINDER) lead surface. A way of grasping the tape path condition by electronic means is monitoring the video head output envelope waveform with an oscilloscope. However, the fact that visual observation is essential in order to know whether the tape is running through the various guides in a smooth and natural way should be kept in mind when checking and adjusting.
Also remember that the position of tape guides is not greatly affected by the replacement of the UPPER DRUM (UPPER CYLINDER) or the COMPL DRUM (COMPL CYLINDER), provided that it is correctly performed, and that only the replaced parts should be adjusted after replacing a tape guide or COMPL HEAD BRACKET, since the position of the other tape guides shall not change considerably.

6-4-1. Preparations for Adjustment

(1) Clean the tape transport surfaces (See Fig. 6-4-1.).

(2) Connect the oscilloscope. Connect the channel 1 probe to the envelope waveform test point, and the channel 2 probe to the RF SW P test point. During adjustment, apply a trigger to the L side of the RF SW P in order to monitor the waveform output from channel 1 of the video head.

Note : Since oscilloscope connection points differ according to the model, refer to the "Test Point for Tape Path Adjustment" allocation figure in the electric circuit adjustment section of the service manual book.

(3) Use a dentist's mirror for visual observation of tape path condition.

(4) Use a nut box (VHJ-0048) for adjustment of the fixed guides.

(5) Use an eccentric driver (VHJ-0003) for adjustment of the guide rollers.

(6) When adjusting height of the fixed guides, guide rollers or COMPL head bracket, turn the special nut or the upper flange clockwise to push the tape downward, and counterclockwise to make the tape rise up.

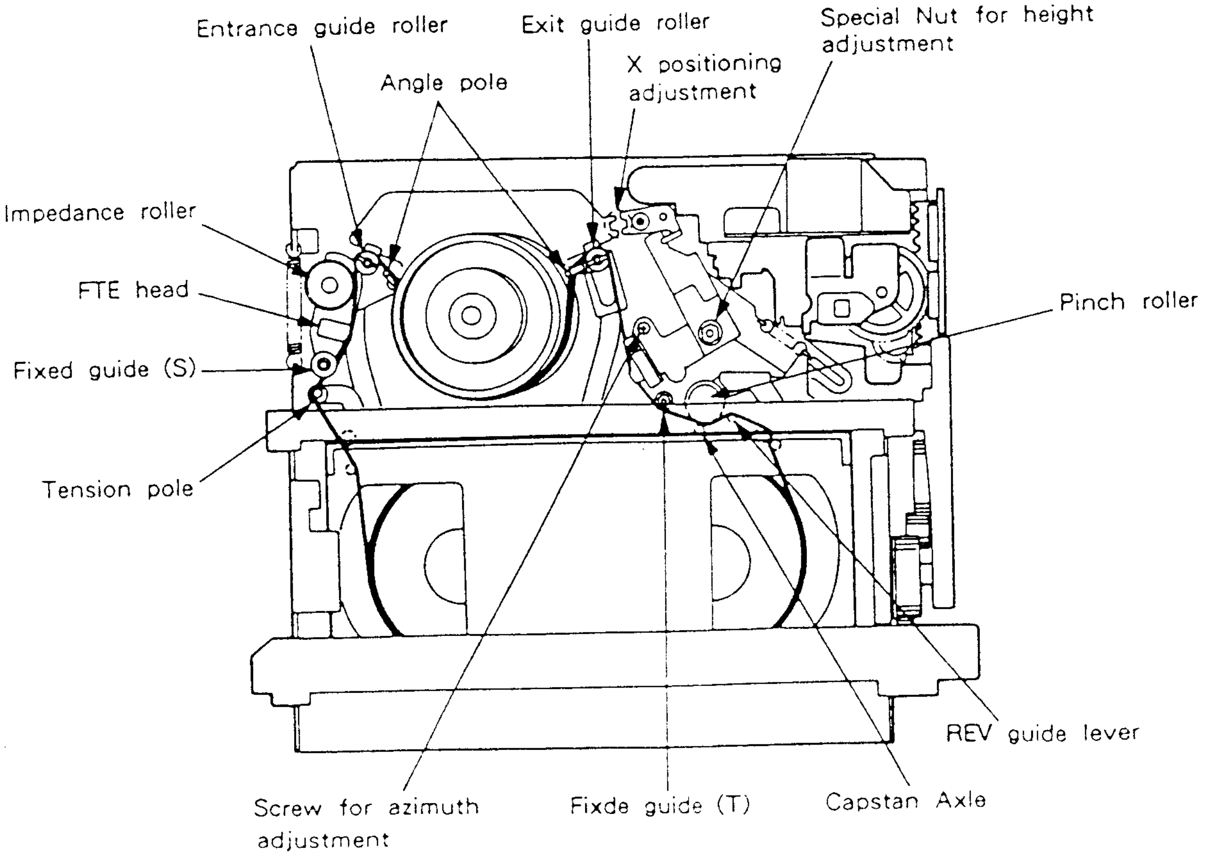

Entrance guide roller
Exit guide roller
Special Nut for height adjustment
Angle pole
X positioning adjustment
Impedance roller
FTE head
Fixed guide (S)
Tension pole
Pinch roller
REV guide lever
Screw for azimuth adjustment
Fixde guide (T)
Capstan Axle

Fig. 6-4-1 Preparation for Adjustment

6-4-2. Adjustment by Visual Observation after Guide Roller, Fixed Guide or COMPL Head Bracket Replacement

Perform this adjustment after removing or replacing any of the above parts. Only for the replaced or removed parts, play back an alignment tape (VHJ-0009) beforehand and adjust height by visual observation.

(1) Fixed Guides (See Fig. 6-4-2.)
Adjust so that the tape upper edge does not make contact with the fixed guide upper flange, and the tape lower edge does not make contact with the fixed guide lower flange. Gaps A and B should remain equal.

(2) Guide Rollers (See Fig. 6-4-3.)
The tape should not be curled by the guide roller upper and lower flanges. It should also run smoothly, without moving up and down on the DRUM (CYLINDER) lead surface.

Note : An excessive guide roller pressure may cause tape damage.

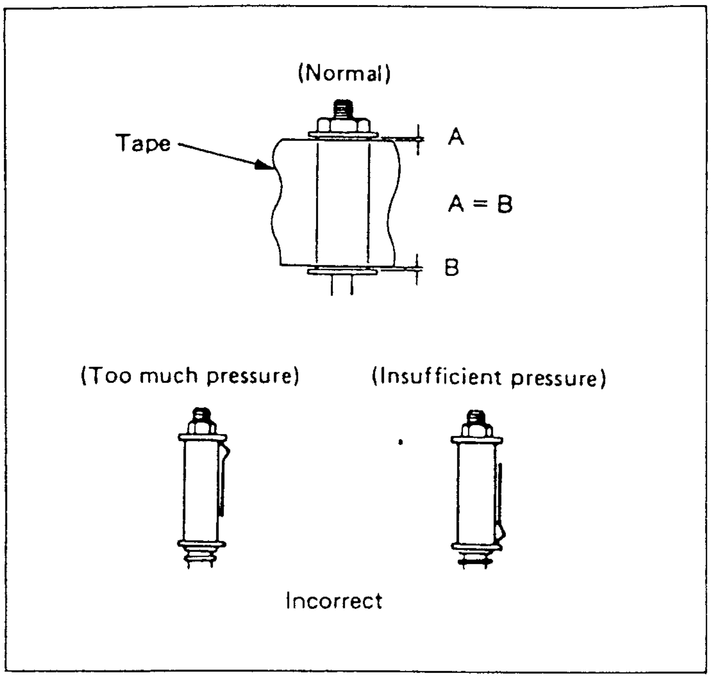

(Normal)
Tape
A
A = B
B
(Too much pressure)
(Insufficient pressure)
Incorrect

Fig. 6-4-2 (1) Pre-set for Fixed Guide

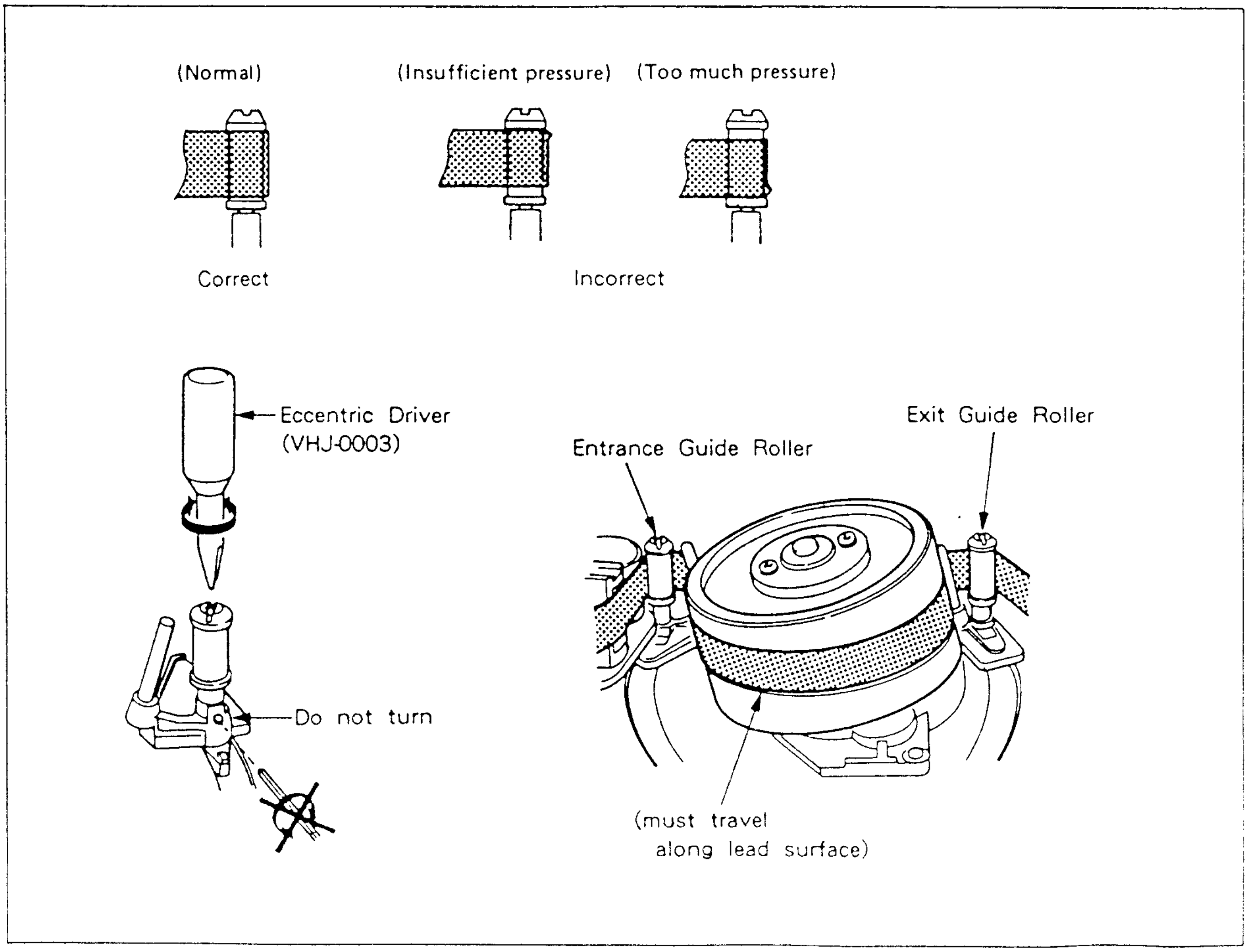

(Normal)
(Insufficient pressure)
(Too much pressure)
Correct
Incorrect
Eccentric Driver
(VHJ-0003)
Do not turn
Entrance Guide Roller
Exit Guide Roller
(must travel
along lead surface)

Fig. 6-4-3 (2) Pre-set for Guide Roller

(3) COMPL Head Bracket (ACE Head) (See Fig. 6-4-4.)
Adjust the special nut so that the tape edge runs between the audio head upper end and the control head lower end. Gaps A and B should be of about the same width. Since at this point it is only required that the control signal is picked up and the servo circuit works normally, no adjusting screws except the COMPL head bracket special nut should be touched.

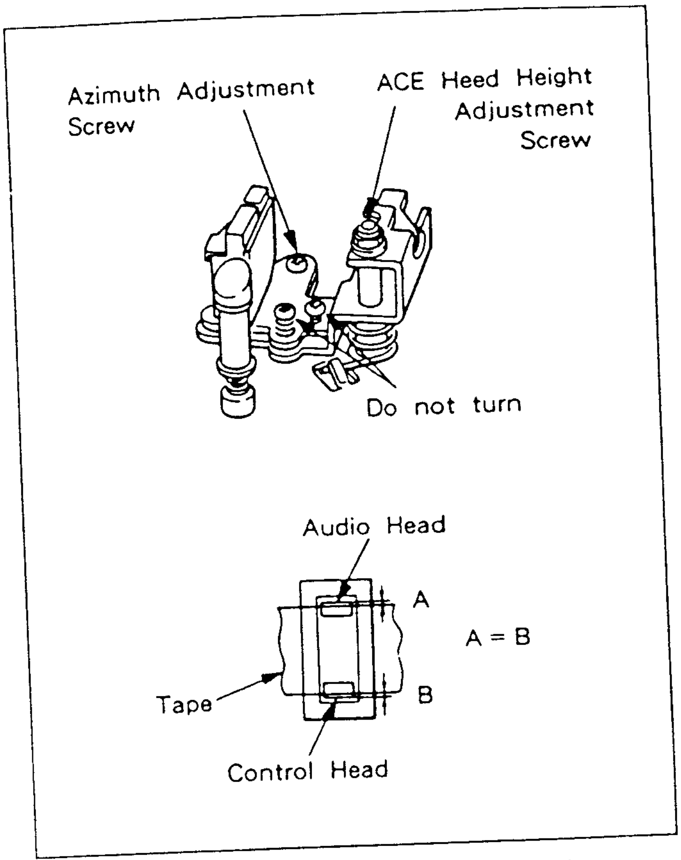

Azimuth Adjustment Screw
ACE Heed Height Adjustment Screw
Do not turn
Audio Head
A
A = B
Tape
B
Control Head

Fig. 6-4-4 (3) Pre-set for Compl Head Bracket

6-4-3. Entrance Side Fixed Guide (S) Height Adjustment (See Fig. 6-4-5.)

1) Rotate the fixed guide (S) counterclockwise to lift the tape somewhat, then insert the fixed guide height gauge (VHJ-0053) into the lower side of the fixed guide (S) lower flange.
2) Rotate the fixed guide (S) special nut clockwise a little at a time until the lower flange makes contact with the upper surface of the fixed guide height gauge, causing a slight drag.
3) After rotating the special nut 90° counterclockwise, remove the fixed guide height gauge.
4) After adjusting the guide rollers in section 6-4-2, play back the alignment tape (VHJ-0009). Confirm that the tape lower edge runs in close contact with the fixed guide (S) lower flange. In case too much pressure has left a gap between the tape and the lower flange, or excessive lifting has caused curling of the tape lower edge, perform fine adjustment. However, do not adjust the special nut beyond 90° clockwise and 45° counterclockwise.

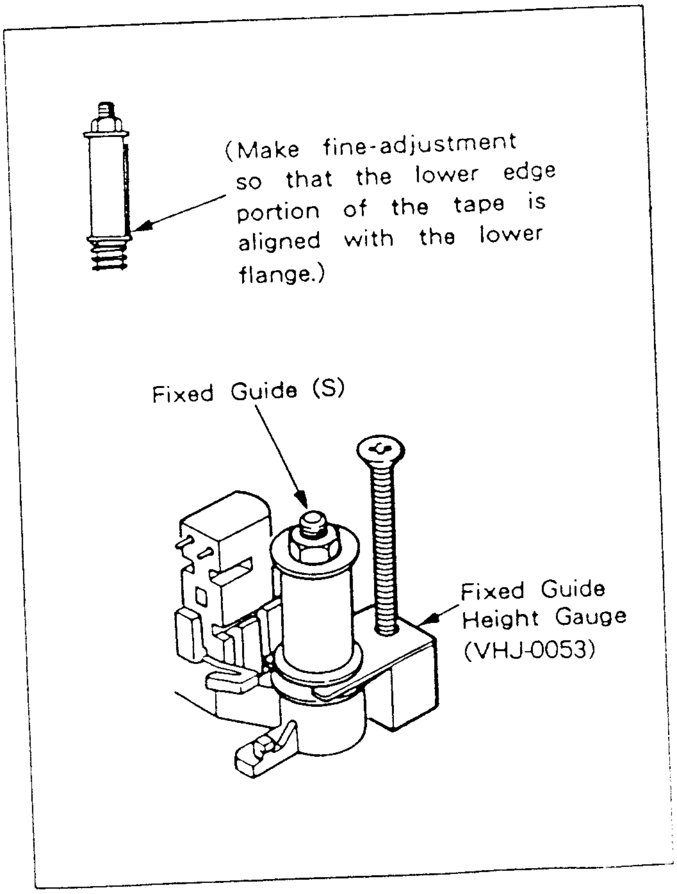

(Make fine-adjustment so that the lower edge portion of the tape is aligned with the lower flange.)
Fixed Guide (S)
Fixed Guide Height Gauge (VHJ-0053)

Fig. 6-4-5

(3) COMPL Head Bracket (ACE Head) (See Fig. 6-4-4.)

Adjust the special nut so that the tape edge runs between the audio head upper end and the control head lower end. Gaps A and B should be of about the same width. Since at this point it is only required that the control signal is picked up and the servo circuit works normally, no adjusting screws except the COMPL head bracket special nut should be touched.

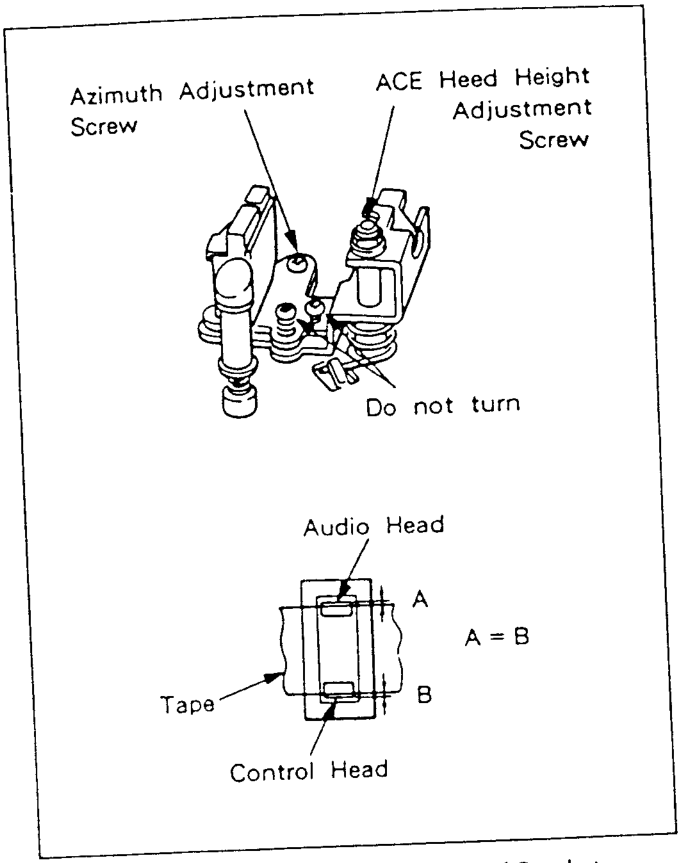

Azimuth Adjustment Screw
ACE Heed Height Adjustment Screw
Do not turn
Audio Head
A
A = B
Tape
B
Control Head

Fig. 6-4-4 (3) Pre-set for Compl Head Bracket

6-4-3. Entrance Side Fixed Guide (S) Height Adjustment (See Fig. 6-4-5.)

1) Rotate the fixed guide (S) counterclockwise to lift the tape somewhat, then insert the fixed guide height gauge (VHJ-0053) into the lower side of the fixed guide (S) lower flange.
2) Rotate the fixed guide (S) special nut clockwise a little at a time until the lower flange makes contact with the upper surface of the fixed guide height gauge, causing a slight drag.
3) After rotating the special nut 90° counterclockwise, remove the fixed guide height gauge.
4) After adjusting the guide rollers in section 6-4-2, play back the alignment tape (VHJ-0009). Confirm that the tape lower edge runs in close contact with the fixed guide (S) lower flange. In case too much pressure has left a gap between the tape and the lower flange, or excessive lifting has caused curling of the tape lower edge, perform fine adjustment. However, do not adjust the special nut beyond 90° clockwise and 45° counterclockwise.

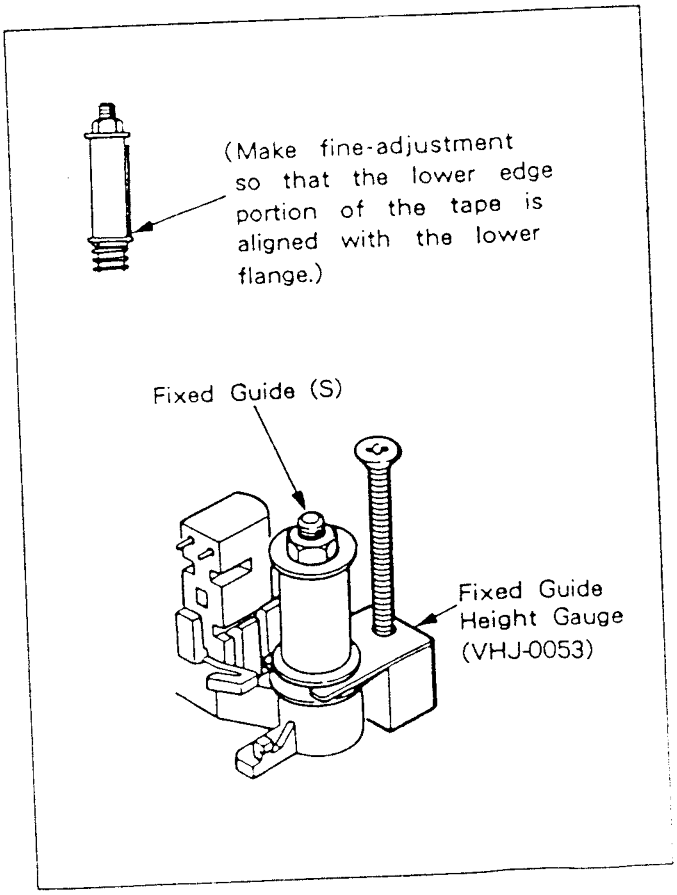

(Make fine-adjustment so that the lower edge portion of the tape is aligned with the lower flange.)
Fixed Guide (S)
Fixed Guide Height Gauge (VHJ-0053)

Fig. 6-4-5

6-4-5. Exit Side Fixed Guide (T) Adjustment (See Fig. 6-4-7.)

1) Load the alignment tape (VHJ-0009) and set the PLAY mode.
2) Rotate the special nut counterclockwise so that the lower flange lifts the tape until its lower edge is slightly curled.
3) Rotate the special nut clockwise a little at a time until curling of the tape lower edge is removed.
4) Confirm at each mode (PLAY, F.SEARCH, R. SEARCH, F.F and REW) that the tape runs along the lower flange and that no curling occurs.

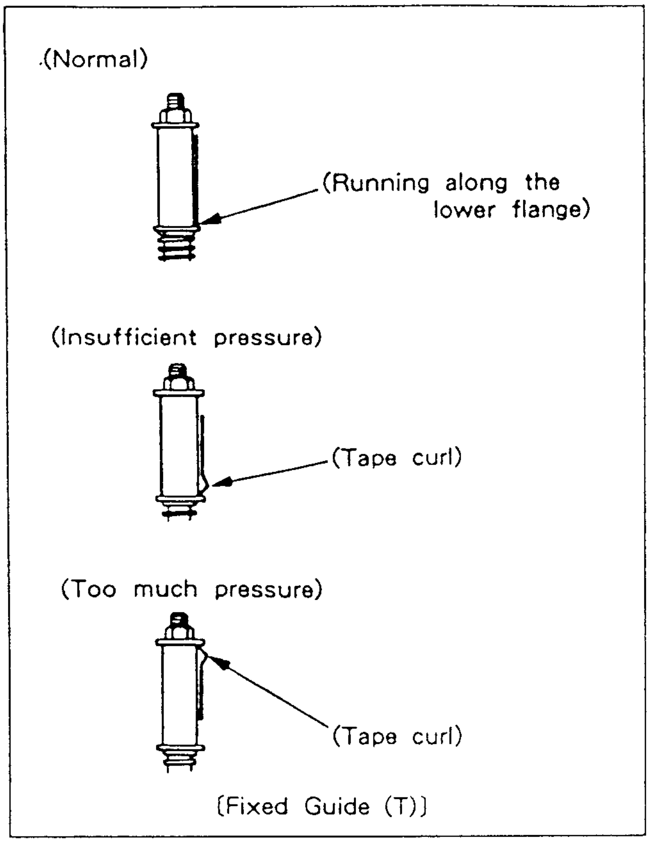

(Normal)
(Running along the lower flange)
(Insufficient pressure)
(Tape curl)
(Too much pressure)
(Tape curl)
〔Fixed Guide (T)〕

Fig. 6-4-7

6-4-6. COMPL Head Bracket (ACE Head) Adjustment

(1) Height Adjustment and Azimuth Adjustment (See Fig. 6-4-8.)

1) Load the alignment tape (VHJ-0009) and set the PLAY mode.
2) Monitor the audio output waveform with the oscilloscope.
3) Rotate the azimuth adjustment screw until the audio output waveform amplitude is maximum.
4) After loosening the ACE head height adjustment special nut, rotate it slowly clockwise until amplitude of the audio output waveform is maximum, then adjust it finely clockwise to the point just before the said waveform amplitude begins to decrease.
5) Rotate the azimuth adjustment screw until amplitude of the audio output waveform is maximum.
6) Confirm that the audio output waveform amplitude does not fluctuate.

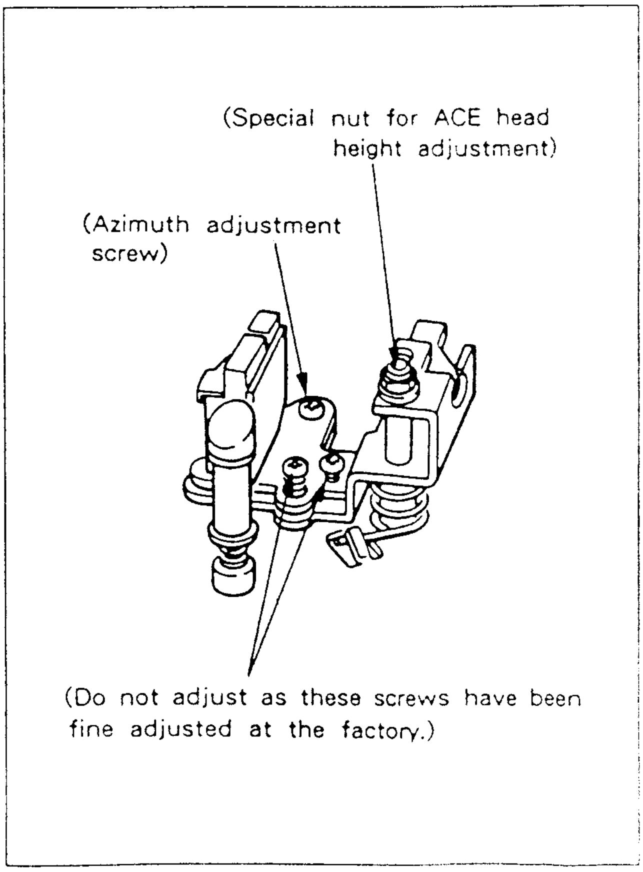

(Special nut for ACE head height adjustment)
(Azimuth adjustment screw)
(Do not adjust as these screws have been fine adjusted at the factory.)

Fig. 6-4-8

(2) Tracking (X Value) Adjustment (See Fig. 6-4-9.)

1) Load the alignment tape (H-7099-175-H) and set the PLAY mode.
2) Set tracking to the center position with the tracking control key (See Note below).
3) Rotate the stopper bracket fixing screw 180° counterclockwise.
4) Monitor the video head output envelope waveform with the oscilloscope.
5) Adjust the stopper bracket position so that amplitude of the envelope waveform becomes maximum at the tracking center and the envelope waveform amplitude changes by the same amount when shifting the tracking center by pressing the plus (+) and minus (−) tracking control keys.
6) Tighten the fixing screw.
7) Perform servo circuit channels 1/2 switching position adjustment (refer to Electrical Adjustment).

Note : For models equipped with auto tracking, always set to the manual tracking mode before adjustment. To confirm the tracking center position, press the tracking keys (+, −) and observe the front panel clock display. It will read "T − : −" at the tracking center, "T − : , T − − : " when keeping the minus (−) key pressed, and "T : −, T : − −" when keeping the plus (+) key pressed. The time indication will be restored 2 to 3 seconds after the tracking keys are released.

6-4-7. Checking after Adjustment

1) Play back the alignment tape (H-7099-175-H) and confirm that the envelope waveform rise immediately, and that there is no fluctuation in the envelope and audio output waveforms.
2) Load an E-180 cassette, record it and play it back. Then, confirm again that the envelope waveform rise immediately, and that there is no fluctuation in the envelope and audio output waveforms (during recording, input a 1kHz signal to the audio input terminals. Be sure to use an unspoiled E-180 cassette).

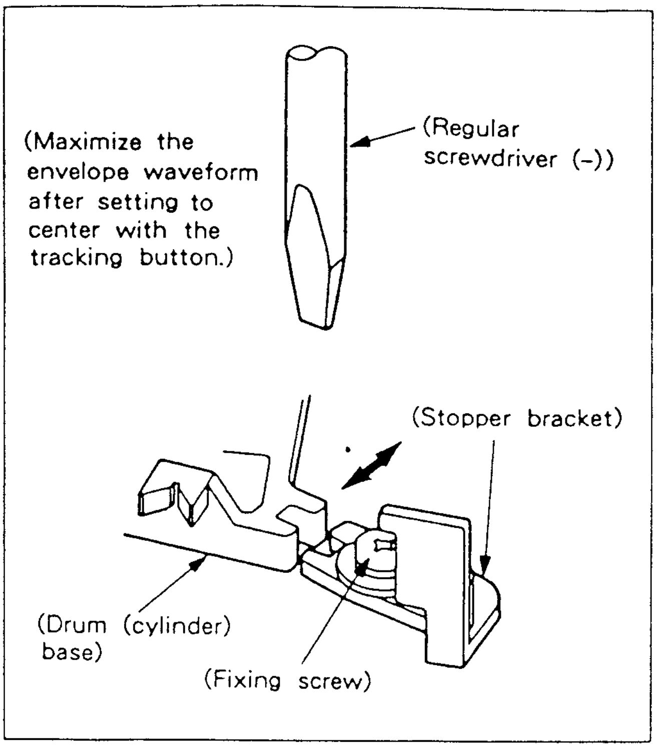

(Maximize the envelope waveform after setting to center with the tracking button.)
(Regular screwdriver (−))
(Stopper bracket)
(Drum (cylinder) base)
(Fixing screw)

Fig. 6-4-9

3) Set the PLAY mode, then turn power OFF (INITIAL mode) and set the PLAY mode again. Confirm that the envelope waveform rise immediately. Also check that the tape is not bent around the pinch rollers.
4) Confirm that the envelope waveform rise immediately, after changing from the FF, REW, F.SEARCH and R.SEARCH modes into PLAY. Also check that the tape is not bent around the pinch rollers.
5) Confirm that no tape curling or sliding-up occurs at the upper and lower flanges of the tape guides in the PLAY, FF, REW, F.SEARCH and R. SEARCH modes.
6) In the PLAY mode, confirm that the tape runs as shown in Fig. 6-4-10.

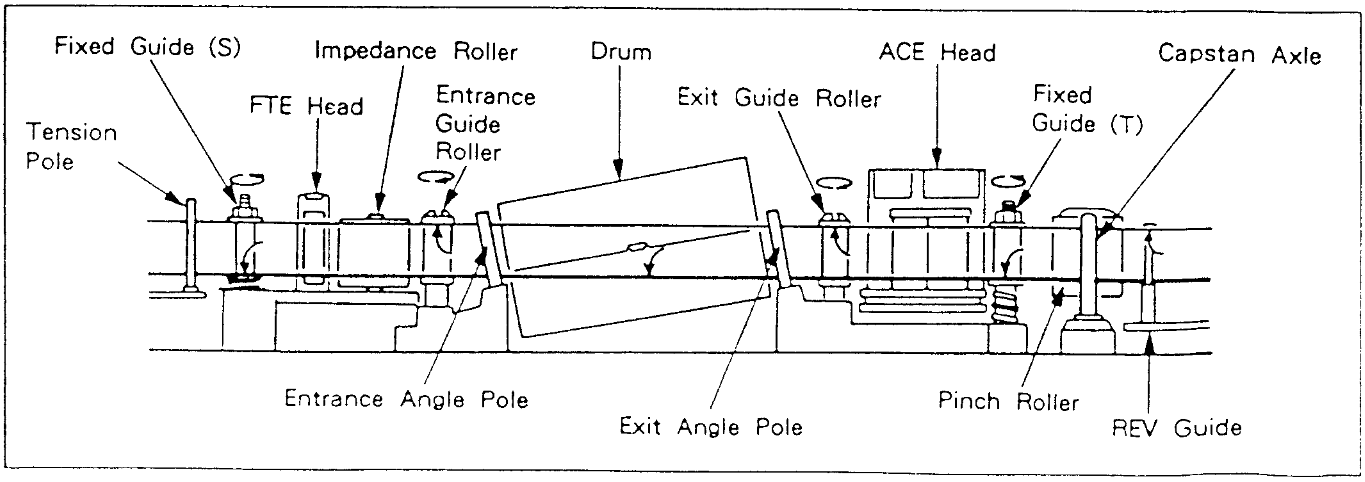

Fixed Guide (S)
Tension Pole
FTE Head
Impedance Roller
Entrance Guide Roller
Drum
Exit Guide Roller
ACE Head
Fixed Guide (T)
Capstan Axle
Entrance Angle Pole
Exit Angle Pole
Pinch Roller
REV Guide

Fig. 6-4-10

SECTION 6
ELECTRICAL ADJUSTMENT

2. ELECTRICAL ADJUSTMENT

2-1. PREPARATION

2-1-1. EQUIPMENT

- Colour TV monitor
- PAL Colour-bar generator (with RF and LINE OUTPUT)
- Audio frequency oscillator
- Oscilloscope (dual trace; frequency response: 10MHz or more; probe: 10:1)
- Frequency counter (countable to 10MHz or higher)
- Digital voltmeter
- AC voltmeter
- In/output probes

[Alignment Tape (MH-2)] (H-7099-052-H)

In making the adjustment, an alignment tape for VHS (PAL). If a model is specified, be sure to use a tape of the model. If not either model of a tape can be used.

	Time	Video signal	Audio signal
1	10 minutes	Stair-step	6 kHz
2	5 minutes	———	3 kHz
3	10 minutes	Color bar	1 kHz
4	3 minutes	RF sweep	———

2-1-2. SET-UP

Because the RF input signal is used for circuit adjustments, connect the colour-bar generator to the ANT IN terminal of the VCR. The RF input signal is processed by the tuner and IF circuit. It is important that the video output signal of the IF circuit satisfies the items shown in Fig. 2-1. Connect the oscilloscope to the VIDEO OUTPUT terminal of the video circuit, and then check the video output signal.

- The amplitude of the sync signal should be approximately 0.3 Vp-p.
- The amplitude of the video signal should be approximately 0.7 Vp-p.
- While observing the oscilloscope or TV screen, make fine-tuning adjustments so that the colour burst amplitude is approximately 0.3 Vp-p.
- Check to be sure that there is no spike noise in the sync part of the horizontal sync signal.

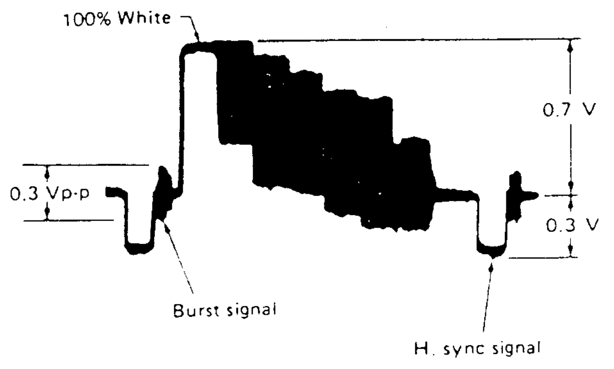
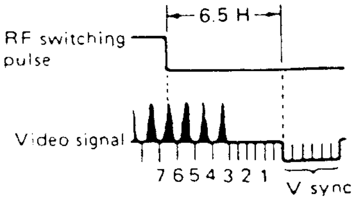


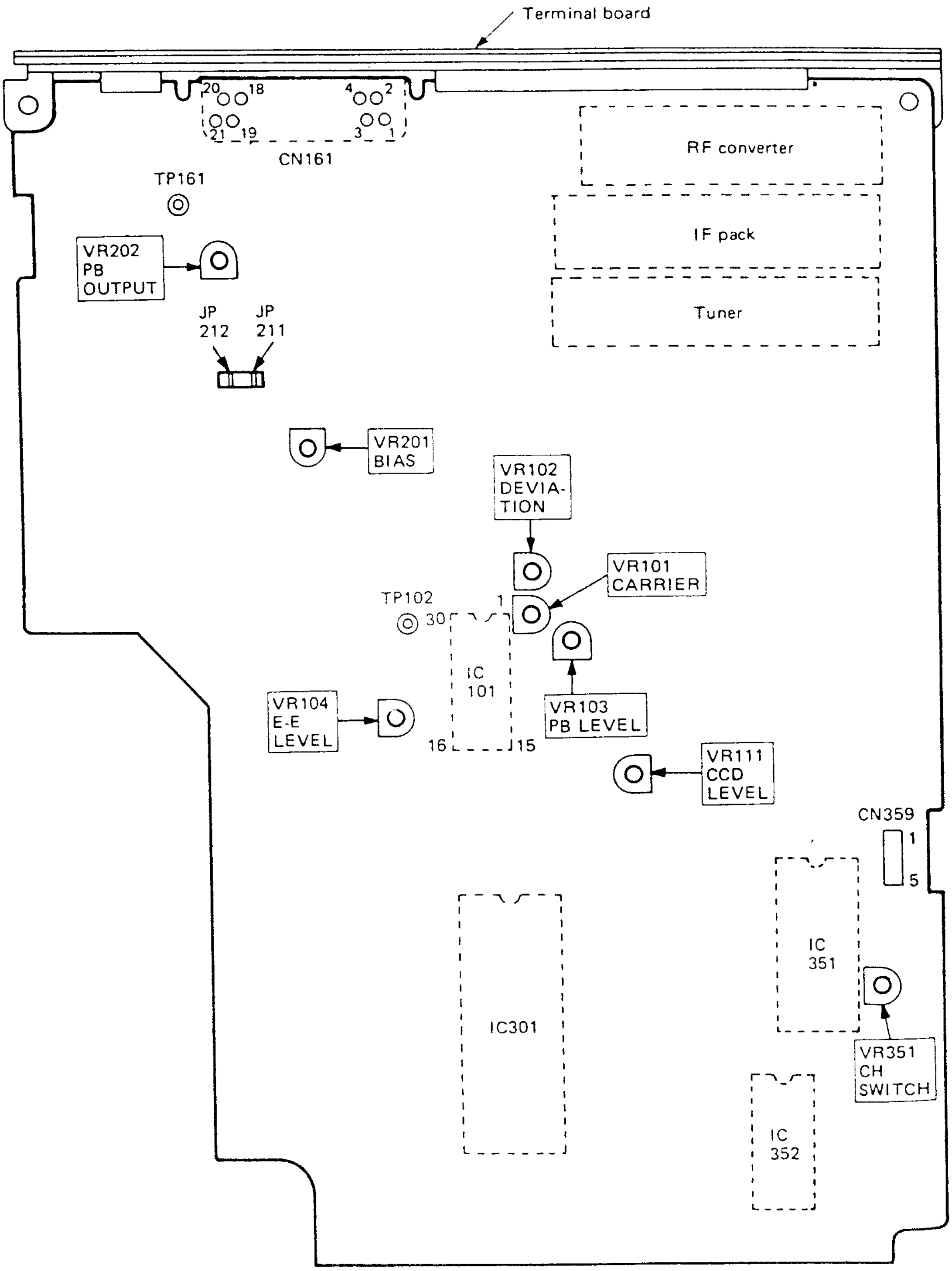
Fig. 2-1

2-2. SERVO CIRCUIT ADJUSTMENT ... CP-1 PCB

NOTE (1): These adjustments should be carried out upon completion of the tape transport adjustments.
(2): If the tape transport adjustments are carried out after these adjustments, follow the procedures again in CH-1, CH-2 SWITCHING POSITIONS.

No.	Item	Input	Mode	Point	Location	Remark
1	CH-1, CH-2 SWITCHING POSITION	Alignment cassette (MH-2)	PLAY	VIDEO OUTPUT TP161 or CN161 pin 19 CN359 pin 1 (trigger)	VR351	 6.5 H RF switching pulse Video signal 7 6 5 4 3 2 1 V sync 1. Set the tracking control to the center position (on the display " T — : — "). 2. Adjust VR351 so that the phase of the leading edge of the vertical sync signal is delayed 6.5 ± 0.5 H from the fall of the RF switching pulse waveform.

No.	Item	Input	Mode	Point	Location	Remark
2	STILL V-LOCK	Colour bar from Colour bar generator	REC ↓ PLAY ↓ STILL	TV screen	VR358 (Rear panel)	1. Playback the recorded part, and put the VCR in the STILL mode. 2. Adjust VR358 so that the V jitter (very fine movement of the vertical sync) is minimized.

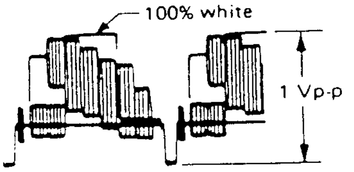
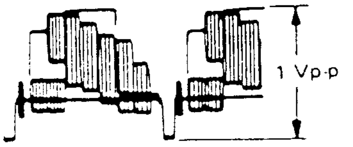
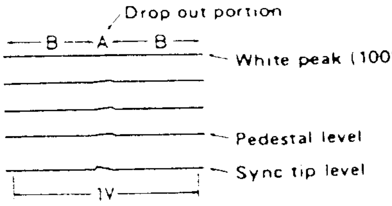
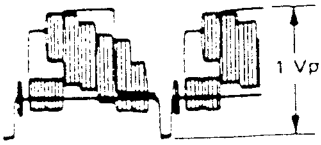


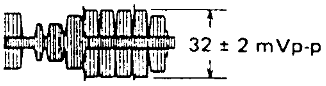
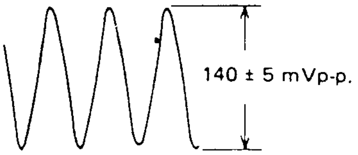
Terminal board
20
18
4
2
21
19
3
1
CN161
TP161
RF converter
IF pack
Tuner
VR202 PB OUTPUT
JP 212
JP 211
VR201 BIAS
VR102 DEVIA-TION
VR101 CARRIER
TP102
30
1
IC 101
16
15
VR104 E-E LEVEL
VR103 PB LEVEL
VR111 CCD LEVEL
CN359
1
5
IC 351
IC301
VR351 CH SWITCH
IC 352

Fig. 2-2-1 CP-1 PCB (Foil side view)

2-3. VIDEO CIRCUIT ADJUSTMENT... CP-1 PCB and VP-1 ASSY

NOTE (1): When adjustment No. 1, No. 2 and No. 5 terminate VIDEO OUTPUT or terminal CN161 pin 19 at 75 ohms.
(2): To make this adjustment, alternately make the adjustments described in No. 4 and No. 5 below. Repeat this procedure until both adjustment values are satisfied.
(3): 'No-signal REC mode' is not to supply any signal to VIDEO INPUT terminal or CN161 pin 20.

No.	Item	Input	Mode	Point	Location	Remark
1	E-E LEVEL NOTE(1)	Colour bar (100% white level) from Colour bar generator	E-E	VIDEO OUTPUT TP161 or CN161 pin 19 (CP-1 PCB)	VR104	 Adjust VR104 so that the level is 1.00 ± 0.05 Vp-p.
2	PLAYBACK LEVEL NOTE(1)	Alignment cassette (MH-2)	PLAY (Colour bar)	VIDEO OUTPUT TP161 or CN161 pin 19 (CP-1 PCB)	VR103	 Adjust VR103 so that the level is 1.00 ± 0.05 Vp-p.
3	CCD LEVEL	Alignment cassette (MH-2)	PLAY	VIDEO OUTPUT TP161 or CN161 pin 19 (CP-1 PCB)	VR111	 Drop out portion B A B White peak (100%) Pedestal level Sync tip level 1V 1. Set the horizontal scale (TIME/DIV) of the oscilloscope to 1 msec./div.. 2. Adjust VR111 so that the drop out portion "A" of white peak (100%) and other portion "B" is same level.
4	CARRIER SET NOTE(2),(3)	No-signal	REC	TP102 or IC101 pin 30 (CP-1 PCB)	VR101	1. Set the channel selector buttons to the AV position and put the VCR in the no-signal mode. 2. Adjust VR101 so that the frequency is 3.85 ± 0.05 MHz.
5	DEVIATION NOTE(1), (2)	Colour bar (100% white level) from Colour bar generator	REC (Adjustment) ↓ PLAY (Check)	VIDEO OUTPUT TP161 or CN161 pin 19 (CP-1 PCB)	VR102	 1. Playback the recorded part, and check that the level is 1.00 ± 0.05 Vp-p. 2. If the level is not 1.00 ± 0.05 Vp-p, adjust VR102 until the value is satisfied.

No.	Item	Input	Mode	Point	Location	Remark
6	CHRO MINANCE SIGNAL RECORDING CURRENT	Colour bar from Colour bar generator	REC	TP181 (HOT) shield case (GND) (VP-1 ASSY)	VR182	 1. Rotate VR181 counter-clockwise fully to the minimun level. 2. Adjust VR182 so that the level is 32 ± 2 mVp-p.
7	LUMINANCE SIGNAL RECORDING CURRENT NOTE(3)	No-signal	REC	TP181 (HOT) shield case (GND) (VP-1 ASSY)	VR181	 1. Set the channel selector buttons to AV position and put the VCR in the no-signal REC mode. 2. Adjust VR181 so that the level is 140 ± 5 mVp-p.

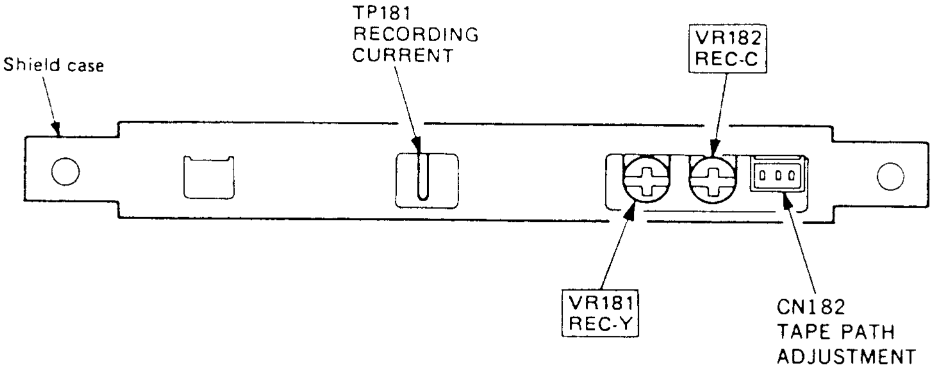

Shield case
TP181
RECORDING
CURRENT
VR182
REC-C
VR181
REC-Y
CN182
TAPE PATH
ADJUSTMENT

Fig. 2-3-1 VP-1 ASSY

2-4. AUDIO CIRCUIT ADJUSTMENT... CP-1 PCB

NOTE (1): No-signal record mode' is not to supply any signal to AUDIO INPUT terminal or CN161 pin 2, 6.
NOTE (2): Item No. 2 apply to the model that equipped with 21 pin SCART on the rear terminal board.
NOTE (3): Item No. 3 apply to the model that equipped with RCA pin jack on the rear terminal board.

No.	Item	Input	Mode	Point	Location	Remark
1	BIAS	No-signal	REC	JP212 JP211(GND)	VR201	1. Set the channel selector buttons to the AV position and put the VCR in the no-signal record mode. 2. Adjust VR201 so that the level is 22 mVp-p.
2	PLAYBACK OUTPUT LEVEL	Audio signal (1 KHz, −3.8 dBs) from Audio signal generator	REC ↓ PLAY	AUDIO OUTPUT CN161 pin 1 or 3	VR202	Adjust VR202 so that the recorded 1 KHz output level becomes −3.8 dBs in the PLAY mode.
3	PLAYBACK OUTPUT LEVEL	Audio signal (1 KHz, −20 dBs) from Audio signal generator	REC ↓ PLAY	AUDIO OUTPUT terminal	VR202	Adjust VR202 so that the recorded 1 KHz output level becomes −8 dBs in the PLAY mode.

2-5. TUNER IF CIRCUIT ADJUSTMENT... IF Pack

No.	Item	Input	Mode	Point	Location	Remark
1	RF AGC	TV broadcast	E-E	TV screen	VR611	1. Turn VR611 in the direction which causes snow to appear, then in the opposite direction until the snow just disappears.

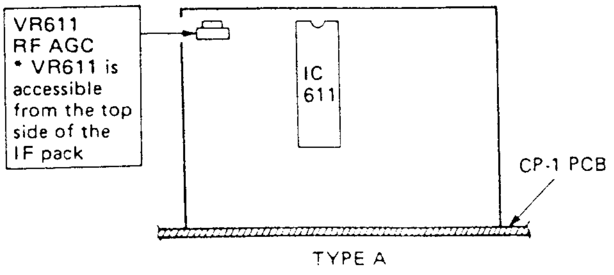


Fig. 2-5-1 IF Pack PCB (Part side view)

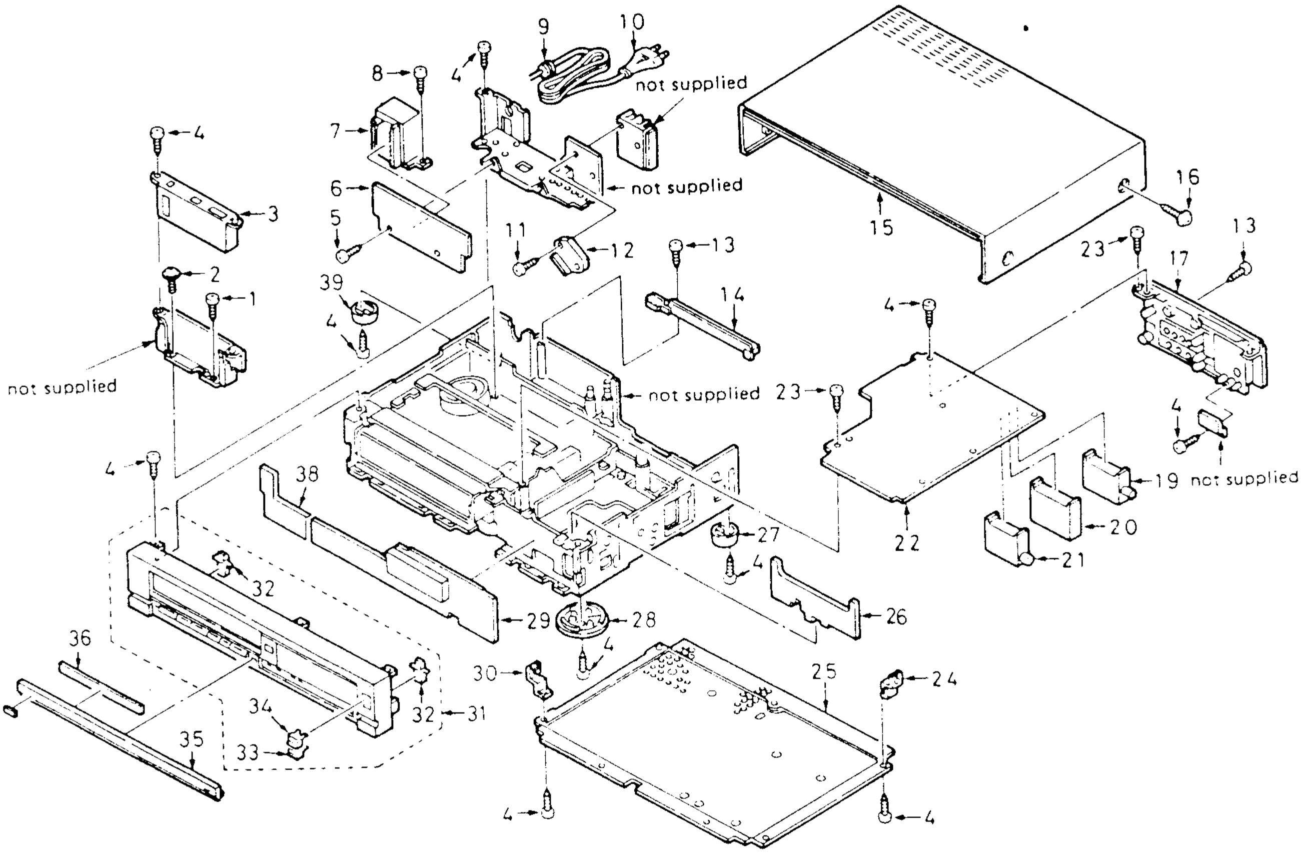
SECTION 7
EXPLODED VIEWS

NOTE:

- The mechanical parts with no reference number in the exploded views are not supplied.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part number suffix -XX and -X may be different from the parts specified in the components used on the set.
- Color Indication of Appearance Parts
  Example:
  (RED) . . . KNOB, BALANCE (WHITE)
  ↑ Cabinet's Color ↑ Parts Color

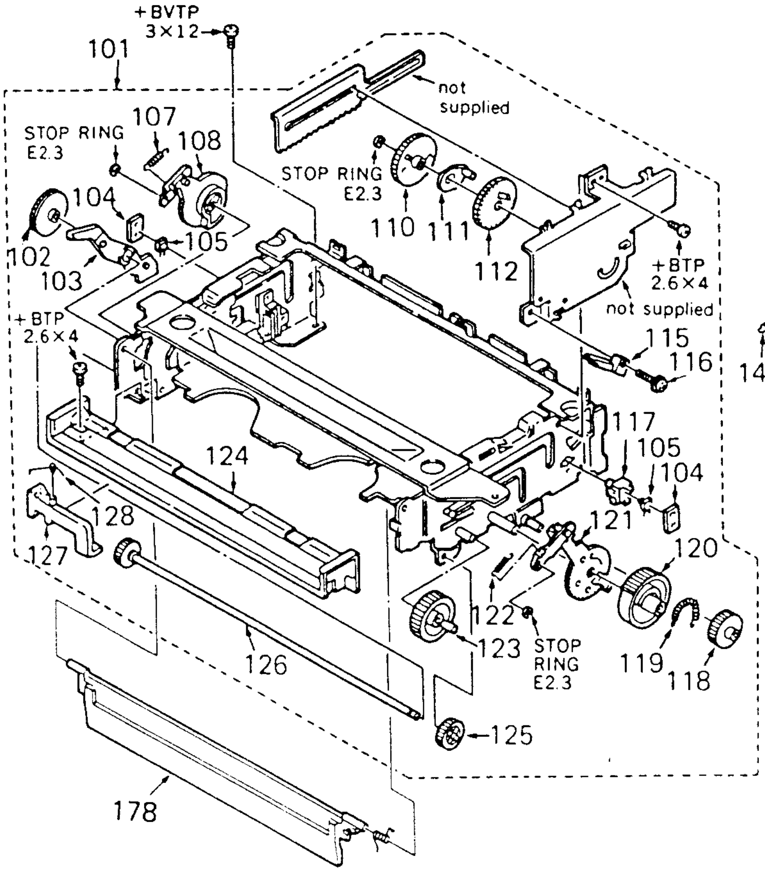
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

7-1. CABINET & CHASSIS PARTS

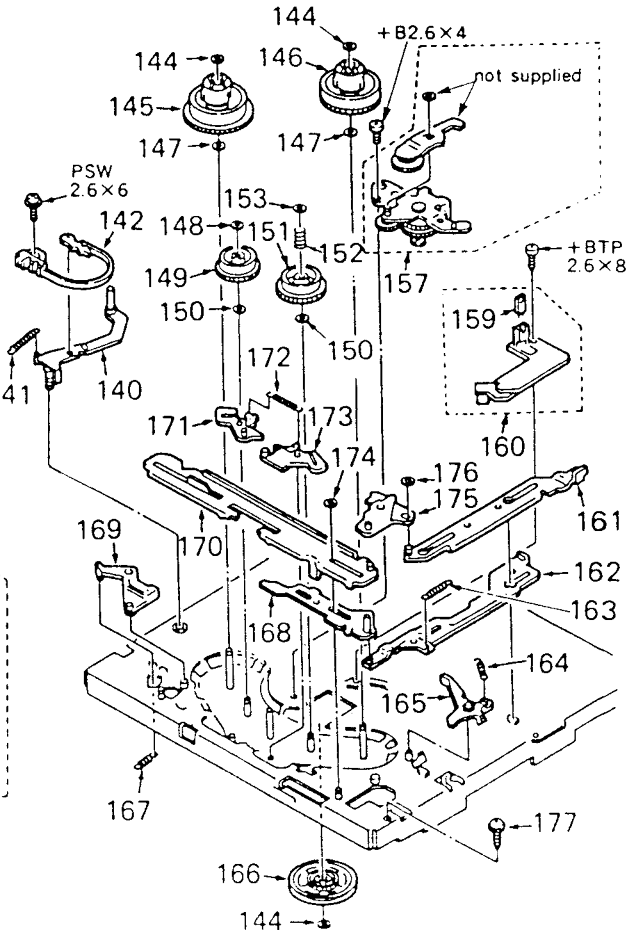


Ref.No	Part No.	Description	Remark
1	7-685-661-19	SCREW +BVTP 4×12 TYPE2 N-S	
2	7-682-947-01	SCREW +PSW 3×6	
3	*A-6725-722-A	VP-1 BOARD, COMPLETE	
4	7-685-547-14	SCREW +BTP 3×10 TYPE2 N-S	
5	7-685-646-21	SCREW +BVTP 3×8	
6	*A-6725-721-A	PW-1 BOARD, COMPLETE	
7	⚠ 1-448-862-11	TRANSFORMER, POWER (T5001)	
8	7-685-659-21	SCREW +BVTP 4×8	
9	3-741-474-01	FIXER	
10	⚠ 1-575-325-11	CORD, POWER	
11	7-685-650-21	SCREW +BVTP 3×16	
12	*A-6723-423-A	PW-2 BOARD, COMPLETE	
13	7-685-647-11	SCREW +BVTP 3×10	
14	3-740-337-01	BLIND	
15	3-740-326-01	COVER, TOP	
16	3-740-334-01	SCREW, SPECIAL	
17	1-569-138-11	TERMINAL	
19	⚠ — — -	MODULATOR, RF	
20	1-466-269-11	IF PACK	
21	1-465-353-11	TUNER PACK	
22	*A-6725-758-A	CP-1 BOARD, COMPLETE	
23	7-685-547-19	SCREW +BTP 3×10 TYPE2 N-S	
24	3-740-336-01	BRACKET	
25	3-740-325-01	COVER, BOTTOM	
26	*A-6725-724-A	TM-3 BOARD, COMPLETE	
27	3-740-333-01	STAND (B)	
28	3-740-327-01	ASSY STAND FRONT	
29	*A-6725-725-A	TM-1 BOARD, COMPLETE	
30	3-740-335-01	BRACKET, CABINET	
31	3-741-484-01	ASSY CABINET FRONT	
32	3-740-330-01	LOCK	
33	3-740-310-01	BUTTON (CH) (—), HINGE	
34	3-740-309-01	BUTTON (CH) (+), HINGE	
35	3-741-468-01	DOOR	
36	3-741-439-01	INDICATOR (DOOR)	
38	*A-6725-723-A	TM-2 BOARD, COMPLETE	
39	3-740-332-01	STAND (A)	

7-2. MECHANISM PARTS 1



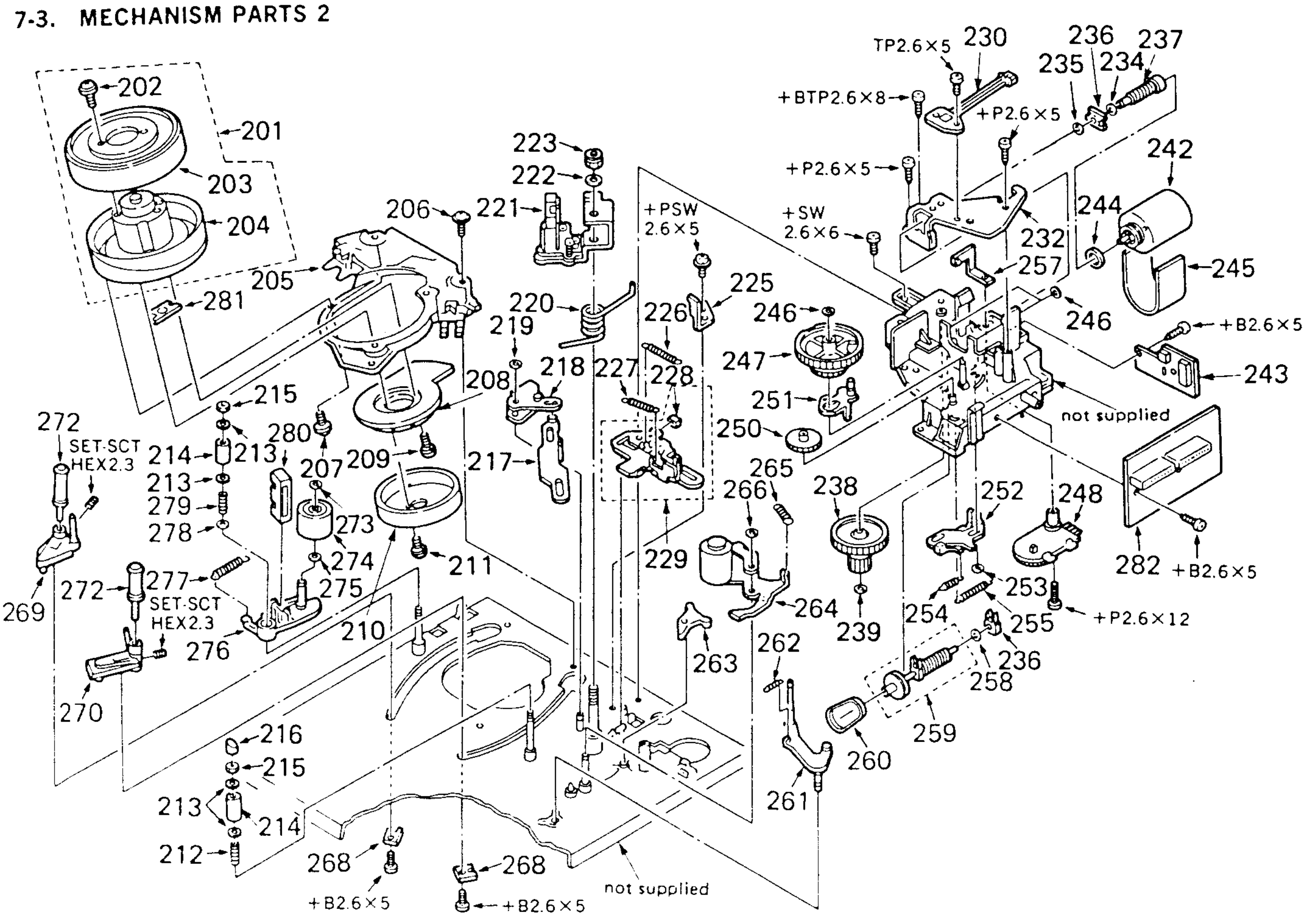
+BVTP
3×12
101
STOP RING
E2.3
107
108
104
105
102
103
+BTP
2.6×4
STOP RING
E2.3
110
111
112
not
supplied
+BTP
2.6×4
not supplied
115
116
117
105
104
121
120
124
128
127
126
122
123
STOP
RING
E2.3
119
118
125
178



144
+B2.6×4
144
146
not supplied
145
147
147
PSW
2.6×6
142
153
148
151
152
157
+BTP
2.6×8
149
150
150
159
172
141
140
171
173
160
174
176
175
161
169
170
162
163
168
164
165
167
177
166
144

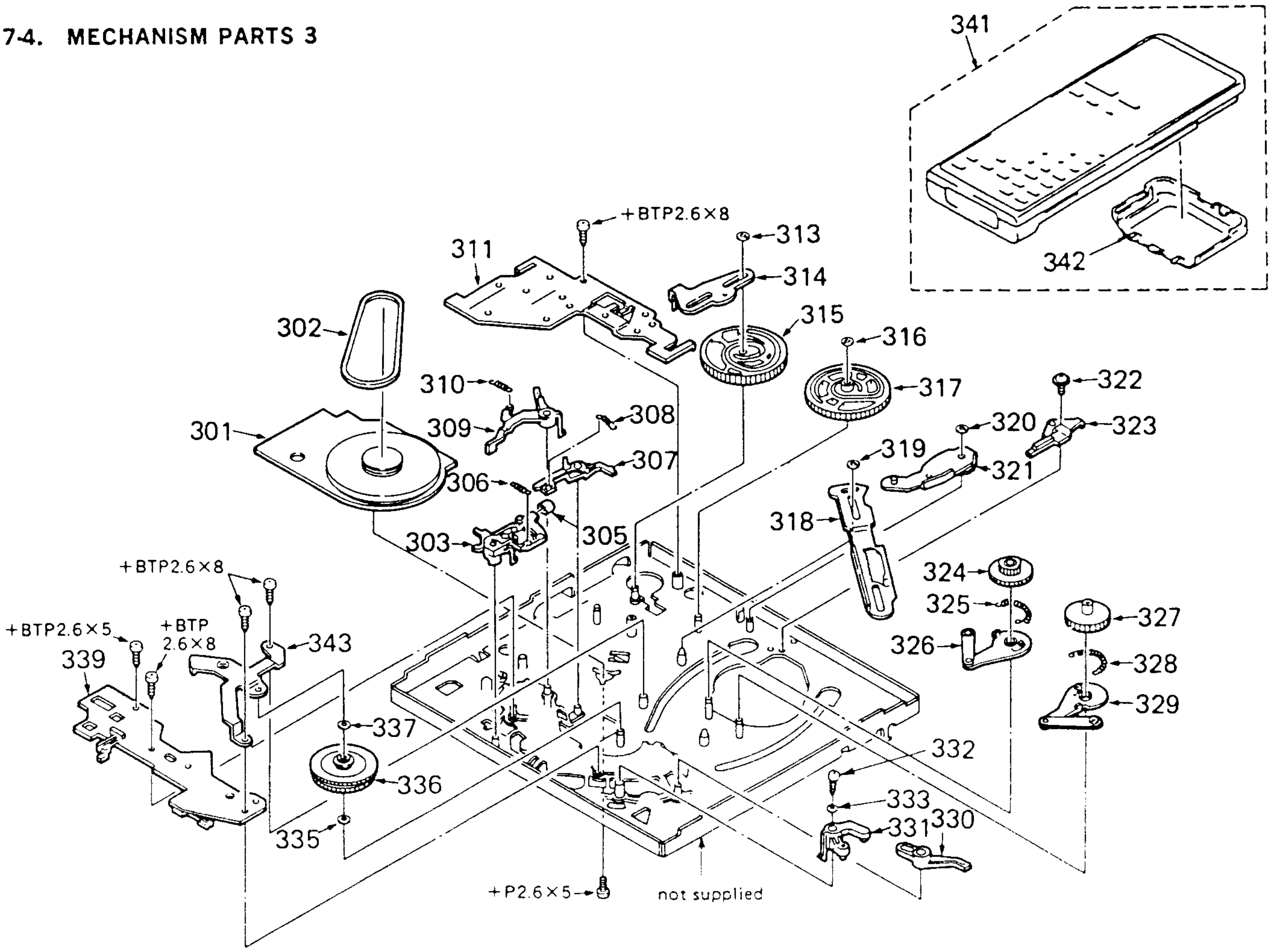
No.	Part No.	Description	Remark
101	A-6751-415-A	CASSETTE COMPARTMENT ASSY	
102	3-735-722-01	GEAR, IDLER (LEFT)	
103	3-735-721-01	DOOR, SWITCHING LINK	
104	3-735-734-01	LID	
105	1-808-710-11	PHOTO TRANSISTOR	
107	3-735-720-01	SPRING	
108	3-735-719-01	LEVER (L) ASSY, GEAR	
110	3-735-731-01	GEAR, LOCK	
111	3-735-732-01	LEVER ASSY, PINION	
112	3-735-730-01	GEAR, PINION	
115	3-735-729-01	SW, LEAF	
116	3-735-775-01	SCREW (2X9), +PSW	
117	*3-735-733-01	HOLDER, TR	
118	3-735-728-01	GEAR, IDLER	
119	3-735-725-01	SPRING	
120	3-735-724-01	GEAR, MAIN	
121	3-735-723-01	GEAR ASSY, LEVER	
122	3-735-726-01	SPRING	
123	3-735-727-01	GEAR, IDLER (RIGHT)	
124	3-735-716-01	FRAME, LOWER	
125	3-735-718-01	GEAR (R)	
126	3-735-717-01	ROD ASSY	
127	3-735-715-01	LEVER, SAFETY SW	
128	3-735-714-01	SPRING	
140	3-735-653-01	LEVER ASSY, TENSION	
141	3-735-654-01	SPRING	
142	3-735-690-01	HOLDER ASSY, BAND	
144	3-735-755-01	WASHER (DIA.2.6)	
145	3-735-624-01	REEL ASSY, SUPPLY	
146	3-735-623-01	REEL ASSY, TAKE-UP	
147	3-735-752-01	WASHER (DIA.3), ADJUSTMENT	
147	3-735-753-01	WASHER (DIA.3), ADJUSTMENT	
147	3-735-754-01	WASHER (DIA.3), ADJUSTMENT	
148	3-735-751-01	WASHER (DIA.2)	
149	3-735-620-01	GEAR, SUPPLY REEL	
150	3-735-750-01	WASHER (DIA.2.6), SPECIAL	
151	3-735-621-01	GEAR, TAKE-UP REEL	
152	3-735-622-01	SPRING (T)	
153	3-735-749-01	WASHER (DIA.2)	
157	3-735-625-01	CLUTCH ASSY, IDLER	
159	1-808-722-11	DIODE LN59 (LED)	
160	*1-589-161-11	PCB ASSY, MC-4	
161	*3-735-662-01	PLATE ASSY, SLIDE	
162	*3-735-626-01	BRAKE (C) ASSY	
163	3-735-627-01	SPRING	
164	3-735-665-01	SPRING	
165	3-735-664-01	BRAKE SUB ASSY, T	
166	3-735-652-01	PULLEY	
167	3-735-781-01	SPRING SUB SUPPLY	
168	*3-735-628-01	BRAKE, SLIDE ACT	
169	3-735-655-01	BRAKE SUB, S	
170	*3-735-661-01	PLATE ASSY, SLIDE	
171	3-735-656-01	BRAKE ASSY, S	
172	3-735-658-01	SPRING	
173	3-735-657-01	BRAKE ASSY, T	
174	3-735-761-01	WASHER (DIA.2.6)	
175	3-735-663-01	LEVER, CONTROL	
176	3-735-751-01	WASHER (DIA.2)	
177	3-735-745-01	SCREW (4X12), +T TP	
178	3-740-302-01	DOOR (CASSETTE)	

7-3. MECHANISM PARTS 2


202
201
203
204
205
206
281
221
222
223
+PSW 2.6×5
220
219
218
226
225
227
228
208
215
272
SET-SCT HEX2.3
214
213
280
207
209
217
213
279
278
273
274
211
275
210
269
272
277
SET-SCT HEX2.3
276
270
229
216
215
213
214
212
268
268
+B2.6×5
+B2.6×5
not supplied
TP2.6×5
230
236
237
235
234
+BTP2.6×8
+P2.6×5
242
+P2.6×5
+SW 2.6×6
232
244
257
245
246
246
+B2.6×5
247
243
251
not supplied
250
265
266
238
252
248
282
+B2.6×5
253
+P2.6×12
264
254
255
239
262
236
263
258
259
260
261

No.	Part No.	Description	Remark
201	A-6050-671-A	CYLINDER BOARD, COMPLETE	
202	3-735-776-01	SCREW (3X8), +PW	
203	3-740-375-01	CYLINDER (UPPER) ASSY	
204	3-735-735-01	CYLINDER (LOWER) ASSY	
205	*3-735-737-01	CYLINDER BASE	
206	3-735-748-01	SCREW (3X6), +PWH	
207	3-735-777-01	SCREW (2.6X8), +PWH	
208	1-462-284-11	STATOR	
209	3-735-779-01	SCREW (2.3X8), +PSW	
210	*1-461-017-11	ROTOR	
211	3-735-778-01	SCREW (2.3X6), +PSW	
212	3-735-677-01	SPRING	
213	3-735-767-01	WASHER, SPECIAL	
214	3-735-676-01	GUIDE, TAPE	
215	3-735-689-01	NUT (M3), SPECIAL	
216	*3-735-678-01	CAP	
217	*3-735-672-01	SLIDE ASSY, PINCH	
218	*3-735-673-01	PINCH LEVER ASSY	
219	3-735-759-01	WASHER (DIA.3)	
220	3-735-680-01	SPRING	
221	3-735-679-01	BRACKET, COMPL	
222	3-735-681-01	SPACER	
223	3-735-682-01	NUT (M5), SPECIAL	
225	*3-735-683-01	BRACKET, STOPPER	
226	3-735-669-01	SPRING	
227	3-735-670-01	SPRING	
228	3-735-668-01	DAMPER	
229	3-735-667-01	CAM ASSY, SLIDE	
230	3-735-711-01	SENSOR ASSY, DEW	
232	*3-740-356-01	BRACKET, HOLDER	
234	3-740-357-01	WASHER (DIA2.1)	
235	3-741-412-01	SPECIAL WASHER	
236	3-735-696-01	HOLDER, WORM	
237	3-735-706-01	WORM ASSY, F	
238	3-735-697-01	GEAR ASSY, HELICAL	
239	3-735-756-01	WASHER (DIA.3)	
241	*3-740-355-01	DAMPER, MOTOR	
242	3-735-707-01	MOTOR ASSY, L	
243	*1-589-223-11	PC BOARD ASSY, MC-3	
244	3-735-708-01	DAMPER, WORM	
245	*3-740-358-01	DAMPER, MOTOR	
246	3-735-773-01	WASHER (DIA.4)	
247	3-735-703-01	GEAR (F), HELICAL	
248	1-571-930-11	SWITCH, ROTARY	
250	3-735-704-01	GEAR	
251	*3-740-366-01	LEVER, FRONT	
252	*3-735-700-01	SLIDE ASSY, F	
253	3-735-756-01	WASHER (DIA.3)	
254	3-735-702-01	SPRING	
255	3-735-701-01	SPRING	
257	3-740-354-01	PLATE, NUT	
258	3-735-774-01	WASHER (DIA.2)	
259	3-735-695-01	GEAR ASSY, WORM	
260	3-735-709-01	BELT (LOADING)	
261	3-735-659-01	LEVER ASSY, REV (G)	
262	3-735-660-01	SPRING	
263	3-735-671-01	LEVER, ACT BRAKE	
264	3-735-674-01	PINCH ROLLER, COMPL	
265	3-735-675-01	SPRING	
266	3-735-757-01	WASHER (DIA.3.6)	
268	3-735-631-01	PLATE, GUIDE	
269	3-735-629-01	ROLLER (S) ASSY, BASE	
270	3-735-632-01	ROLLER (T) ASSY, BASE	
272	3-735-630-01	ROLLER ASSY, GUIDE	
273	3-735-769-01	WASHER (DIA.1.5)	
274	3-735-685-01	ROLLER, IMPEDANCE	
275	3-735-771-01	WASHER (DIA.2), SPECIAL	
276	*3-735-684-01	LEVER ASSY, FE HEAD	
277	3-735-686-01	SPRING	
278	3-735-770-01	WASHER (DIA.6)	
279	3-735-688-01	SPRING	
280	3-735-687-01	HEAD, FTE	
281	3-735-738-01	SPACER, MOTOR	
282	1-599-220-11	PC BOARD ASSY, MC-2	

7-4. MECHANISM PARTS 3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+P2.6×5
not supplied

No.	Part No.	Description	Remark
301	1-541-679-11	MOTOR, CAPSTAN	
302	3-735-691-01	BELT (REEL DRIVE)	
303	3-735-644-01	CLUTCH ASSY, LEVER	
305	3-735-645-01	DAMPER, LEVER CLUTCH	
306	3-735-646-01	SPRING	
307	3-735-647-01	LEVER, CONVERSION CLUTCH	
308	3-735-648-01	SPRING	
309	3-735-649-01	BRAKE ASSY, CAP	
310	3-735-650-01	SPRING	
311	*3-735-692-01	BRACKET	
313	3-735-759-01	WASHER (DIA.3)	
314	*3-735-643-01	PLATE ASSY, CAM	
315	3-735-639-01	CAM, MODE	
316	3-735-756-01	WASHER (DIA.3)	
317	3-735-640-01	CAM, MAIN	
318	3-735-642-01	RACK, LOAD	
319	3-735-758-01	WASHER (DIA.2.6)	
320	3-735-757-01	WASHER (DIA.3.6)	
321	3-735-641-01	LEVER ASSY, LOAD CAM	
322	3-735-772-01	SCREW (3X4), +PWH	
323	3-735-693-01	PLATE ASSY, GROUND	
324	3-735-638-01	GEAR (T)	
325	3-735-637-01	SPRING (T)	
326	3-735-636-01	LOAD (T) ASSY, LEVER	
327	3-735-635-01	GEAR (S)	
328	3-735-634-01	SPRING	
329	3-735-633-01	LOAD (S) ASSY, LEVER	
330	3-735-766-01	LEVER, RETURN TENSION	
331	3-735-666-01	LEVER ASSY, CONTROL	
332	3-735-762-01	SCREW (2.3X12), +PTP	
	3-735-763-01	SCREW (2.3X5), +PTP	
333	3-735-764-01	WASHER (DIA.2.3)	
	3-735-765-01	WASHER (DIA.2.6)	
335	3-735-760-01	WASHER (DIA.3), SPECIAL	
336	3-735-651-01	GEAR ASSY, FRICTION	
337	3-735-755-01	WASHER (DIA.2.6)	
339	*1-589-164-11	COMPL, MC-1	
339-1	1-571-931-11	SWITCH, LEAF (FRONT LOADING) (MC-1)	
339-2	1-571-932-11	SWITCH, LEAF (ERASURE-PREVENSION) (MC-1)	
339-3	1-808-723-11	PHOTO COUPLER (T REEL SENSOR) (MC-1)	
339-4	3-735-744-01	SPACER, PHOTO SENSOR (MC-1)	
341	1-465-252-31	REMOTE CONTROL (RMT-V252)	
342	2-181-754-01	LID. BATTERY CASE	
343	3-740-397-01	BRACKET PULLEY	

SECTION 8
ELECTRICAL PARTS LIST

NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Standard resistors are omitted.
  Refer to the following list for their part numbers.

CAPACITORS:
MF: μF, PF: μμF.

RESISTORS
- All resistors are in ohms.
- F: nonflammable

COILS
- MMH: mH, UH: μH

SEMICONDUCTORS
In each case, U: μ, for example:
UA...: μA..., UPA...: μPA...,
UPC...: μPC, UPD...: μPD...

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description			Remark
	*A-6723-423-A	PW-2 BOARD, COMPLETE			
		*********************			
		IC			
IC521	1-808-853-11	IC STK5473			
		TRANSFORMER			
T5001	1-448-862-11	TRANSFORMER, POWER			

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Ref.No	Part No.	Description			Remark
	*A-6725-758-A	CP-1 BORAD, COMPLETE			
		*********************			
		TRANSISTOR			
B1001	8-729-900-89	TRANSISTOR DTC144ES			
B1003	8-729-900-89	TRANSISTOR DTC144ES			
B1601	8-729-900-89	TRANSISTOR DTC144ES			
B3001	8-729-900-80	TRANSISTOR DTC114ES			
B3002	8-729-900-89	TRANSISTOR DTC144ES			
B3506	8-729-900-89	TRANSISTOR DTC144ES			
B3507	8-729-900-89	TRANSISTOR DTC144ES			
B3512	8-729-900-89	TRANSISTOR DTC144ES			
B6001	8-729-900-89	TRANSISTOR DTC144ES			
B7001	8-729-900-80	TRANSISTOR DTC114ES			
B7002	8-729-900-65	TRANSISTOR DTA144ES			
		CAPACITOR			
C1001	1-162-195-31	CERAMIC	4.7PF	10%	50V
C1002	1-162-289-31	CERAMIC	390PF	10%	50V
C1003	1-164-073-11	CERAMIC	100PF	10%	50V
C1004	1-162-215-31	CERAMIC	47PF	5%	50V
C1005	1-124-902-00	ELECT	0.47MF	20%	50V
C1006	1-162-281-31	CERAMIC	91PF	10%	50V
C1007	1-164-077-11	CERAMIC	220PF	10%	50V
C1008	1-162-293-31	CERAMIC	820PF	10%	50V
C1009	1-124-257-00	ELECT	2.2MF	20%	50V
C1010	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1011	1-124-902-00	ELECT	0.47MF	20%	50V
C1012	1-164-058-11	CERAMIC	330PF	5%	50V
C1013	1-162-280-31	CERAMIC	82PF	10%	50V
C1014	1-164-073-11	CERAMIC	100PF	10%	50V
C1015	1-130-493-00	MYLAR	0.068MF	5%	50V
C1015	1-163-021-11	CERAMIC CHIP	0.01MF	10%	50V
C1017	1-163-021-11	CERAMIC CHIP	0.01MF	10%	50V
C1018	1-163-021-11	CERAMIC CHIP	0.01MF	10%	50V
C1019	1-124-446-11	ELECT	47MF	20%	10V
C1020	1-124-925-11	ELECT	2.2MF	20%	100V
C1021	1-126-096-11	ELECT	10MF	20%	35V
C1022	1-124-925-11	ELECT	2.2MF	20%	100V
C1023	1-162-292-31	CERAMIC	680PF	10%	50V
C1025	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1026	1-124-234-00	ELECT	22MF	20%	16V

Ref.No	Part No.	Description			Remark
C1027	1-124-465-00	ELECT	0.47MF	20%	50V
C1028	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1029	1-162-291-31	CERAMIC	560PF	10%	50V
C1030	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1031	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1032	1-124-446-11	ELECT	47MF	20%	10V
C1033	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1034	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1035	1-124-446-11	ELECT	47MF	20%	10V
C1036	1-124-791-11	ELECT	1MF	20%	100V
C1037	1-164-064-11	CERAMIC	56PF	5%	50V
C1038	1-162-215-31	CERAMIC	47PF	5%	50V
C1039	1-162-211-31	CERAMIC	33PF	5%	50V
C1040	1-126-163-11	ELECT	4.7MF	20%	50V
C1041	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1042	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1043	1-124-925-11	ELECT	2.2MF	20%	100V
C1046	1-164-072-11	CERAMIC	120PF	5%	50V
C1047	1-161-044-00	CERAMIC	0.0027MF	10%	50V
C1048	1-162-290-31	CERAMIC	470PF	10%	50V
C1101	1-161-494-00	CERAMIC	0.022MF	30%	25V
C1102	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1103	1-124-791-11	ELECT	1MF	20%	100V
C1104	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1105	1-124-791-11	ELECT	1MF	20%	100V
C1106	1-124-791-11	ELECT	1MF	20%	100V
C1107	1-161-494-00	CERAMIC	0.022MF	30%	25V
C1108	1-161-021-11	CERAMIC	0.047MF	10%	25V
C1111	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1112	1-124-126-00	ELECT	47MF	20%	25V
C1113	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1116	1-124-791-11	ELECT	1MF	20%	100V
C1117	1-161-021-11	CERAMIC	0.047MF	10%	25V
C1118	- - -	CERAMIC	43PF	5%	50V
C1119	1-162-281-31	CERAMIC	91PF	10%	50V
C1120	1-161-772-11	CERAMIC	0.1MF	10%	25V
C1121	1-124-446-11	ELECT	47MF	20%	10V
C1122	1-164-073-11	CERAMIC	100PF	10%	50V
C1123	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1125	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1126	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1127	1-124-446-11	ELECT	47MF	20%	10V
C1128	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1401	1-124-442-00	ELECT	330MF	20%	6.3V
C1402	1-124-446-11	ELECT	47MF	20%	10V
C1403	1-126-163-11	ELECT	4.7MF	20%	50V
C1601	1-124-446-11	ELECT	47MF	20%	10V
C1602	1-124-446-11	ELECT	47MF	20%	10V
C1603	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1604	1-124-446-11	ELECT	47MF	20%	10V
C1605	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1606	1-126-114-11	ELECT	470MF	20%	6.3V
C1607	1-164-058-11	CERAMIC	33PF	5%	50V

Ref.No	Part No.	Description			Remark
C1609	1-164-060-11	CERAMIC	39PF	5%	50V
C1610	1-124-455-00	ELECT	100MF	20%	16V
C1611	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1612	1-124-638-11	ELECT	22MF	20%	10V
C2001	1-124-791-11	ELECT	1MF	20%	100V
C2002	1-162-293-31	CERAMIC	820PF	10%	50V
C2004	1-124-963-11	ELECT	33MF	20%	16V
C2005	1-161-054-00	CERAMIC	0.018MF	10%	50V
C2006	1-124-902-00	ELECT	0.47MF	20%	50V
C2008	1-161-327-00	CERAMIC	0.0033MF	30%	50V
C2009	1-124-446-11	ELECT	47MF	20%	10V
C2010	1-126-096-11	ELECT	10MF	20%	35V
C2013	1-161-055-00	CERAMIC	0.022MF	10%	50V
C2015	- - - -	ELECT(BLOCK)	4.7MF		350V
C2016	1-124-791-11	ELECT	1MF	20%	100V
C2017	1-124-963-11	ELECT	33MF	20%	16V
C2018	1-126-094-11	ELECT	4.7MF	20%	35V
C2019	1-124-126-00	ELECT	47MF	20%	25V
C2020	1-162-286-31	CERAMIC	220PF	10%	50V
C2021	1-130-309-00	FILM	0.033MF	5%	100V
C2022	1-161-051-00	CERAMIC	0.01MF	10%	50V
C2024	1-161-051-00	CERAMIC	0.01MF	10%	50V
C2025	1-161-494-00	CERAMIC	0.022MF	30%	25V
C2030	1-124-791-11	ELECT	1MF	20%	100V
C2031	1-124-791-11	ELECT	1MF	20%	100V
C2032	1-124-791-11	ELECT	1MF	20%	100V
C2034	1-124-791-11	ELECT	1MF	20%	100V
C2062	1-124-963-11	ELECT	33MF	20%	16V
C2075	1-124-791-11	ELECT	1MF	20%	100V
C2151	1-162-294-31	CERAMIC	0.001MF	10%	50V
C3001	1-161-051-00	CERAMIC	0.01MF	10%	50V
C3002	1-162-294-31	CERAMIC	0.001MF	10%	50V
C3003	1-124-443-00	ELECT	100MF	20%	10V
C3004	1-124-963-11	ELECT	33MF	20%	16V
C3005	1-161-772-11	CERAMIC	0.1MF	10%	25V
C3006	1-162-211-31	CERAMIC	33PF	5%	50V
C3007	1-162-211-31	CERAMIC	33PF	5%	50V
C3008	1-126-176-11	ELECT	220MF	20%	10V
C3009	1-161-772-11	CERAMIC	0.1MF	10%	25V
C3010	1-162-294-31	CERAMIC	0.001MF	10%	50V
C3011	1-161-772-11	CERAMIC	0.1MF	10%	25V
C3012	1-161-772-11	CERAMIC	0.1MF	10%	25V
C3013	1-124-925-11	ELECT	2.2MF	20%	100V
C3014	1-161-772-11	CERAMIC	0.1MF	10%	25V
C3501	1-130-484-00	MYLAR	0.012MF	5%	50V
C3502	1-124-446-11	ELECT	47MF	20%	10V
C3503	1-161-772-11	CERAMIC	0.1MF	10%	25V
C3504	1-162-286-31	CERAMIC	220PF	10%	50V
C3505	1-130-486-00	MYLAR	0.018MF	5%	50V
C3506	1-130-487-00	MYLAR	0.022MF	5%	50V
C3507	1-161-053-00	CERAMIC	0.015MF	10%	50V
C3509	1-161-053-00	CERAMIC	0.015MF	10%	50V

Ref.No	Part No.	Description			Remark
C3510	1-124-234-00	ELECT	22MF	20%	16V
C3511	1-124-234-00	ELECT	22MF	20%	16V
C3512	1-130-481-00	MYLAR	0.0068MF	5%	50V
C3513	1-136-165-00	FILM	0.1MF	5%	50V
C3514	1-161-048-00	CERAMIC	0.0056MF	10%	50V
C3515	1-161-048-00	CERAMIC	0.0056MF	10%	50V
C3516	1-161-329-00	CERAMIC	0.0068MF	30%	25V
C3517	1-124-234-00	ELECT	22MF	20%	16V
C3518	1-124-234-00	ELECT	22MF	20%	16V
C3519	1-136-167-00	FILM	0.15MF	5%	50V
C3520	1-124-126-00	ELECT	47MF	20%	25V
C3521	1-161-379-00	CERAMIC	0.01MF	20%	25V
C3522	1-124-791-11	ELECT	1MF	20%	100V
C3523	1-162-282-31	CERAMIC	100PF	10%	50V
C3524	1-124-767-00	ELECT	2.2MF	20%	50V
C3525	1-162-294-31	CERAMIC	0.001MF	10%	50V
C3526	1-124-464-11	ELECT	0.22MF	20%	50V
C3527	1-161-379-00	CERAMIC	0.01MF	20%	25V
C3528	1-124-791-11	ELECT	1MF	20%	100V
C3529	1-161-061-11	CERAMIC	0.068MF	10%	50V
C3530	1-126-096-11	ELECT	10MF	20%	35V
C3531	1-123-382-00	ELECT	3.3MF	20%	100V
C3532	1-161-375-00	CERAMIC	0.0022MF	20%	50V
C3533	1-162-294-31	CERAMIC	0.001MF	10%	50V
C3534	1-124-292-00	ELECT	33MF	20%	6.3V
C3535	1-162-294-31	CERAMIC	0.001MF	10%	50V
C3536	1-130-490-11	MYLAR	0.039MF	5%	50V
C3537	1-124-446-11	ELECT	47MF	20%	10V
C3538	1-161-329-00	CERAMIC	0.0068MF	30%	25V
C3540	1-130-494-11	FILM	0.082MF	5%	50V
C3541	1-162-283-31	CERAMIC	120PF	10%	50V
C5401	1-161-379-00	CERAMIC	0.01MF	20%	25V
C5402	1-124-446-11	ELECT	47MF	20%	10V
C6001	1-136-244-11	FILM	0.1MF	2%	50V
C6002	1-126-163-11	ELECT	4.7MF	20%	50V
C6003	1-126-044-11	ELECT	1MF	20%	50V
C6004	1-136-244-11	FILM	0.1MF	2%	50V
C6005	1-126-163-11	ELECT	4.7MF	20%	50V
C6006	1-124-455-00	ELECT	100MF	20%	16V
C6007	1-161-379-00	CERAMIC	0.01MF	20%	25V
C6103	1-162-280-31	CERAMIC	82PF	10%	50V
C6104	1-163-021-11	CERAMIC CHIP	0.01MF	10%	50V
C6105	1-163-021-11	CERAMIC CHIP	0.01MF	10%	50V
C6106	1-164-232-11	CERAMIC CHIP	0.01MF	10%	50V
C6107	1-163-021-11	CERAMIC CHIP	0.01MF	10%	50V
C6108	1-163-021-11	CERAMIC CHIP	0.01MF	10%	50V
C6111	1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V
C6112	1-163-009-11	CERAMIC CHIP	0.001MF	10%	50V
C6113	1-124-767-00	ELECT	2.2MF	20%	50V
C6114	1-163-021-11	CERAMIC CHIP	0.01MF	10%	50V
C6115	1-163-099-00	CERAMIC CHIP	18PF	5%	50V
C6116	1-163-021-11	CERAMIC CHIP	0.01MF	10%	50V
C6117	1-124-252-00	ELECT	0.33MF	20%	50V
C6118	1-163-021-11	CERAMIC CHIP	0.01MF	10%	50V

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description			Remark
C6119	1-163-021-11	CERAMIC CHIP	0.01MF	10%	50V
C6120	1-164-004-11	CERAMIC CHIP	0.1MF	10%	50V
C6124	1-126-177-11	ELECT	100MF	20%	6.3V
C6125	1-101-005-00	CERAMIC	0.022MF		50V
C6126	1-102-123-00	CERAMIC	0.0033MF	10%	50V
C6127	1-102-820-00	CERAMIC	330PF	5%	50V
C6129	1-102-947-00	CERAMIC	10PF	0.5PF	50V
C6130	1-164-232-11	CERAMIC CHIP	0.01MF	10%	50V
C6131	1-163-099-00	CERAMIC CHIP	100PF	10%	50V
C1636	1-163-099-00	CERAMIC CHIP	18PF	5%	50V
C6137	1-163-116-00	CERAMIC CHIP	91PF	5%	50V
C6138	1-126-529-11	ELECT	0.47MF	20%	50V
C6139	1-163-105-00	CERAMIC CHIP	33PF	5%	50V
C6140	1-124-499-11	ELECT	1MF	20%	50V
C6141	1-163-097-00	CERAMIC CHIP	15PF	5%	50V
C6142	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C6143	1-102-129-00	CERAMIC	0.01MF	10%	50V
C6144	1-124-831-11	ELECT	4.7MF	20%	25V
C6153	1-163-107-00	CERAMIC CHIP	39PF	5%	50V
C6155	1-163-021-11	CERAMIC CHIP	0.01MF	10%	50V
C6601	1-126-155-11	ELECT	100MF	20%	6.3V
C6602	1-126-155-11	ELECT	100MF	20%	6.3V
C7001	1-124-234-00	ELECT	22MF	20%	16V
C7002	1-161-772-11	CERAMIC	0.1MF	10%	25V
C7003	1-124-916-11	ELECT	22MF	20%	63V
C7004	1-161-772-11	CERAMIC	0.1MF	10%	25V
C7005	1-124-234-00	ELECT	22MF	20%	16V
C7021	1-161-772-11	CERAMIC	0.1MF	10%	25V
C7022	1-102-976-00	CERAMIC	180PF	5%	50V
C7023	1-161-039-00	CERAMIC	0.001MF	10%	50V
C7024	1-161-772-11	CERAMIC	0.1MF	10%	25V
C7025	1-136-502-11	MYLAR	0.33MF	5%	50V
C7031	1-126-096-11	ELECT	10MF	20%	35V
C7032	1-124-252-00	ELECT	0.33MF	20%	50V
C7033	1-161-043-00	CERAMIC	0.0022MF	10%	50V
C7034	1-161-039-00	CERAMIC	0.001MF	10%	50V

DIODE

Ref.No	Part No.	Description	Remark
D1001	8-719-912-20	DIODE 1SS120	
D1002	8-719-912-20	DIODE 1SS120	
D1003	8-719-912-20	DIODE 1SS120	
D1004	8-719-912-20	DIODE 1SS120	
D1005	8-719-912-20	DIODE 1SS120	
D1601	8-719-912-20	DIODE 1SS120	
D1602	8-719-912-20	DIODE 1SS120	
D1603	8-719-912-20	DIODE 1SS120	
D1604	8-719-912-20	DIODE 1SS120	
D1605	8-719-912-20	DIODE 1SS120	
D1606	8-719-912-20	DIODE 1SS120	
D3001	8-719-901-83	DIODE 1SS83	
D3002	8-719-109-89	DIODE RD5.6ESB2	
D3003	8-719-110-08	DIODE RD8.2ESB2	
D3005	8-719-912-20	DIODE 1SS120	
D3006	8-719-912-20	DIODE 1SS120	
D3007	8-719-912-20	DIODE 1SS120	
D3501	8-719-912-20	DIODE 1SS120	
D3502	8-719-912-20	DIODE 1SS120	
D3503	8-719-912-20	DIODE 1SS120	
D3504	8-719-912-20	DIODE 1SS120	
D3534	8-719-912-20	DIODE 1SS120	
D5401	8-719-912-20	DIODE 1SS120	
D5402	8-719-109-85	DIODE RD5.1ESB2	
D5403	8-719-110-31	DIODE RD12ESB2	
D5404	8-719-901-83	DIODE 1SS83	
D5405	8-719-110-78	DIODE RD33ESB2	
D5406	8-719-110-18	DIODE RD10ESB3	
D6101	8-719-110-14	DIODE RD9.1ESB3	
D6102	1-808-851-11	DIODE 1SS318-TT51	
D6601	8-719-200-02	DIODE 10E-2	
D7001	8-719-912-20	DIODE 1SS120	

DELAY LINE

DL111	1-415-707-11	DELAY

IC

IC101	8-759-821-84	IC LA7340
IC102	1-808-885-11	IC TL8709P
IC103	8-759-821-49	IC LA7330
IC161	8-759-927-56	IC BA7021
IC201	1-806-845-11	IC MC14566B
IC202	8-759-800-81	IC LA7016
IC301	1-808-888-11	IC LC66508B
IC302	1-808-846-11	IC LB1641
IC303	8-759-103-93	IC UPC393C
IC304	8-759-403-44	IC MN1280-S
IC611	1-808-852-11	IC M51366SP
IC701	8-759-157-40	IC UPC574J
IC702	8-759-800-65	IC LA7910
IC703	1-808-849-11	IC LA7214

COIL

L1001	1-410-519-11	INDUCTOR	68UH
L1002	1-410-521-11	INDUCTOR	100UH
L1003	1-410-515-11	INDUCTOR	33UH
L1004	1-410-518-41	INDUCTOR	56UH
L1005	1-412-269-11	CHOKE, HF	
L1006	1-410-519-11	INDUCTOR	68UH
L1007	1-410-316-11	INDUCTOR	1UH
L1102	1-410-512-11	INDUCTOR	18UH
L1103	1-410-322-11	INDUCTOR	3.3UH
L1104	1-410-511-11	INDUCTOR	15UH
L2002	1-412-270-11	CHOKE, HF	
L2003	1-412-271-11	COIL, CHOKE	
L1601	1-410-521-11	INDUCTOR	100UH
L1602	1-410-521-11	INDUCTOR	100UH
L6001	1-410-509-11	INDUCTOR	10UH
L6002	1-410-509-11	INDUCTOR	10UH
L6003	1-410-509-11	INDUCTOR	10UH
L6004	1-410-509-11	INDUCTOR	10UH
L6006	1-410-509-11	INDUCTOR	10UH
L6108	1-410-507-11	INDUCTOR	6.8UH
L6110	1-410-499-41	INDUCTOR	1.5UH
L6111	1-412-360-11	CHOKE, HF	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark
L6601	1-410-511-11	INDUCTOR 15UH	
L6602	1-410-511-11	INDUCTOR 15UH	

TRANSISTOR

Ref.No	Part No.	Description	Remark
Q1001	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q1002	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1003	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1004	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1005	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q1006	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1101	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q1102	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q1103	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1104	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1105	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1401	8-729-140-97	TRANSISTOR 2SB734-34	
Q1402	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q1403	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q1404	8-729-804-25	TRANSISTOR 2SB985-T	
Q1405	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1406	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1601	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q1603	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q1604	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1605	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q2001	8-729-873-40	TRANSISTOR 2SD734-E	
Q5401	1-808-850-11	TRANSISTOR 2SA1703-S-AN	
Q5402	8-729-800-34	TRANSISTOR 2SC3070	
Q5403	8-729-140-97	TRANSISTOR 2SB734-34	
Q5404	8-729-140-97	TRANSISTOR 2SB734-34	
Q6001	8-729-103-12	TRANSISTOR 2SK68A-M	
Q6002	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q6101	8-729-202-79	TRANSISTOR 2SC3120N	
Q6102	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q6103	8-729-202-79	TRANSISTOR 2SC3120N	
Q6104	1-808-928-11	TRANSISTOR 2SC2814	
Q6106	8-729-271-23	TRANSISTOR 2SC2812-L7	
Q7001	8-729-804-25	TRANSISTOR 2SB985-T	
Q7021	8-729-345-85	TRANSISTOR 2SC485K-5	

RESISTOR

Ref.No	Part No.	Description	Remark
R3001⚠	1-212-946-00	FUSIBLE 3.3 5% 1/2W	F
R5404⚠	1-249-416-11	CARBON 820 5% 1/4W	F
R5408⚠	1-249-401-11	CARBON 47 5% 1/4W	F
R6101	1-202-834-00	SOLID 27K 10% 1/2W	
R6117	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W	

TRANSFORMER

Ref.No	Part No.	Description	Remark
T2001	1-406-366-11	COIL, OSC	

VARIABLE RESISTOR

Ref.No	Part No.	Description	Remark
VR101	1-228-995-00	RES, ADJ, METAL GLAZE 22K	
VR102	1-228-994-00	RES, ADJ, METAL GLAZE 10K	
VR103	1-228-990-00	RES, ADJ, METAL GLAZE 1K	
VR104	1-228-994-00	RES, ADJ, METAL GLAZE 10K	
VR111	1-228-990-00	RES, ADJ, METAL GLAZE 1K	
VR201	1-228-997-00	RES, ADJ, METAL GLAZE 100K	
VR202	1-228-994-00	RES, ADJ, METAL GLAZE 10K	
VR351	1-228-998-00	RES, ADJ, METAL GLAZE 220K	
VR358	1-238-819-11	VR, ROTARY 100K	
VR611	1-237-500-21	RES, ADJ, CERMET 1K	

CRYSTAL

Ref.No	Part No.	Description	Remark
X1101	1-577-667-11	CRYSTA, OSC	
X6101	1-577-712-11	FILTER, TSF1321L	
X6104	1-577-716-11	FILTER TPS6.5MB24	
X6105	1-577-669-11	FILTER	
X6106	1-577-670-11	FILTER	
X6107		SFE6.5MB	
X6111	1-577-715-11	DISCR., CERAMIC 6.0MC29	
X6113	1-577-671-11	FILTER	
X6114	1-577-717-11	FILTER	
X6115	1-577-718-11	CRYSTAL CSB100D4	
XF111	1-236-603-11	LC PACK	
XF301	1-577-668-11	RE, CERAMIC	

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*A-6725-721-A PW-1 BOARD, COMPLETE

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CAPACITOR

Ref.No	Part No.	Description	Remark
C5001⚠	1-108-781-00	MYLAR 0.0047MF 20% 125V	
C5104	1-124-910-11	ELECT 47MF 20% 50V	
C5101	1-126-770-11	ELECT 2200MF 20% 25V	
C5102	1-126-770-11	ELECT 2200MF 20% 25V	
C5103	1-126-169-11	ELECT 3300MF 25% 16V	
C5105	1-124-131-00	ELECT 47MF 100V	
C5106	1-136-850-11	FILM 0.1MF 5% 63V	
C5107	1-124-910-11	ELECT 47MF 20% 50V	
C5108	1-123-875-11	ELECT 10MF 20% 50V	
C5109	1-123-875-11	ELECT 10MF 20% 50V	
C5110	1-123-875-11	ELECT 10MF 20% 50V	

DIODE

Ref.No	Part No.	Description	Remark
D5101	8-719-200-02	DIODE 10E-2	
D5102	8-719-200-02	DIODE 10E-2	
D5103	8-719-911-55	DIODE U05G	
D5104	8-719-911-55	DIODE U05G	
D5105	8-719-300-45	DIODE EM-1Z	
D5106	8-719-300-45	DIODE EM-1Z	
D5107	8-719-300-45	DIODE EM-1Z	
D5108	8-719-300-45	DIODE EM-1Z	
D5109	8-719-901-83	DIODE 1SS83	
D5110	8-719-901-83	DIODE 1SS83	
D5111	8-719-110-63	DIODE RD24ESB3	

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description			Remark
		FUSE			
F5001⚠	1-532-066-00	FUSE, TIME-LAG			
F5101⚠	1-532-215-00	FUSE, TIME-LAG			
F5102⚠	1-532-259-00	FUSE, TIME-LAG			
F5103⚠	1-532-203-00	FUSE, TIME-LAG			
F5104⚠	1-532-235-00	FUSE, TIME-LAG			
		TRANSFORMER			
T5001⚠	1-448-862-11	TRANSFORMER, POWER			

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*A-6725-722-A VP-1 BOARD, COMPLETE

	3-740-373-01	SHIELD			
		CAPACITOR			
C1801	1-102-816-00	CERAMIC	120PF	5%	50V
C1802	1-162-208-31	CERAMIC	82PF	10%	50V
C1803	1-161-494-00	CERAMIC	0.022MF	30%	25V
C1804	1-124-791-11	ELECT	1MF	20%	100V
C1805	1-161-043-00	CERAMIC	0.0022MF	10%	50V
C1806	1-161-057-00	CERAMIC	0.033MF	10%	50V
C1807	1-101-880-00	CERAMIC	47PF	5%	50V
C1808	1-101-880-00	CERAMIC	47PF	5%	50V
C1809	1-161-057-00	CERAMIC	0.033MF	10%	50V
C1810	1-161-043-00	CERAMIC	0.0022MF	10%	50V
C1811	1-124-446-11	ELECT	47MF	20%	10V
C1812	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1813	1-162-209-31	CERAMIC	27PF	5%	50V
C1814	1-162-215-31	CERAMIC	47PF	5%	50V
C1815	1-162-219-31	CERAMIC	68PF	5%	50V
C1816	1-164-058-11	CERAMIC	33PF	5%	50V
C1817	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1818	1-124-126-00	ELECT	47MF	20%	25V
C1819	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1820	1-161-494-00	CERAMIC	0.022MF	30%	25V
C1821	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1822	1-161-379-00	CERAMIC	0.01MF	20%	25V
C1823	1-161-039-00	CERAMIC	0.001MF	10%	50V
C1824	1-101-886-00	CERAMIC	62PF	5%	50V
C1825	1-101-884-00	CERAMIC	56PF	5%	50V
C1826	1-102-820-00	CERAMIC	330PF	5%	50V
		IC			
IC181	8-759-820-98	IC LA7320			
		COIL			
L1801	1-410-520-11	INDUCTOR	82UH		
L1802	1-410-489-11	INDUCTOR	390UH		
L1803	1-410-521-11	INDUCTOR	100UH		
L1804	1-410-512-11	INDUCTOR	18UH		

Ref.No	Part No.	Description			Remark
L1805	1-410-511-11	INDUCTOR	15UH		
L1806	1-410-511-11	INDUCTOR	15UH		
L1807	1-410-518-41	INDUCTOR	56UH		
L1808	1-410-521-11	INDUCTOR	100UH		
L1809	1-410-507-11	INDUCTOR	6.8UH		
L1810	1-410-513-11	INDUCTOR	22UH		
		TRANSISTOR			
Q1801	8-729-884-02	TRANSISTOR 2SC2840-D			
Q1802	8-729-884-09	TRANSISTOR 2SC2840			
Q1803	8-729-884-09	TRANSISTOR 2SC2840			
		VARIABLE RESISTOR			
VR181	1-237-500-21	RES, ADJ, CERMET 1K			
VR182	1-237-500-21	RES, ADJ, CERMET 1K			

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*A-6725-723-A TM-2 BOARD, COMPLETE

		DIODE			
D7201	1-808-902-11	DIODE LEDMP3868SY			
D7202	1-808-902-11	DIODE LEDMP3868SY			
		RECIEVER PACK			
RR721	1-466-241-11	IR RECIEVER PACK			
		SWITCH			
S7201	1-572-136-11	SWITCH, PUSH			
S7202	1-572-136-11	SWITCH, PUSH			

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*A-6725-724-A TM-3 BOARD, COMPLETE

		CAPACITOR			
C7301	1-162-210-31	CERAMIC	30PF	5%	50V
C7302	1-162-210-31	CERAMIC	30PF	5%	50V
C7303	1-124-234-00	ELECT	22MF	20%	16V
C7304	1-161-772-11	CERAMIC	0.1MF	10%	25V
		DIODE			
D7301	8-719-911-20	DIODE 1SV112-01			
D7302	8-719-911-20	DIODE 1SV112-01			
		IC			
IC731	1-808-903-11	IC CXP5014H-514S			
		CRYSTAL			
X7301	1-577-672-11	FILTER			

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description			Remark
	*A-6725-725-A	TM-1 BOARD, COMPLETE			
		*********************			
		VFD			
A7101	1-519-564-11	VFD			
		CAPACITOR			
C7100	1-162-199-31	CERAMIC	10PF	5%	50V
C7101	1-162-199-31	CERAMIC	10PF	5%	50V
C7102	1-162-207-31	CERAMIC	22PF	5%	50V
C7103	1-162-207-31	CERAMIC	22PF	5%	50V
C7104	1-161-063-00	CERAMIC	0.1MF	10%	50V
C7105	1-124-234-00	ELECT	22MF	20%	16V
C7106	1-161-379-00	CERAMIC	0.01MF	20%	25V
C7107	1-161-379-00	CERAMIC	0.01MF	20%	25V
C7108	1-126-529-11	ELECT	0.47MF	20%	50V
C7109	1-161-063-00	CERAMIC	0.1MF	10%	50V
C7111	1-161-063-00	CERAMIC	0.1MF	10%	50V
C7112	1-161-379-00	CERAMIC	0.01MF	20%	25V
C7113	1-126-157-11	ELECT	10MF	20%	16V
		DIODE			
D7101	8-719-912-20	DIODE 1SS120			
D7102	8-719-912-20	DIODE 1SS120			
D7103	8-719-912-20	DIODE 1SS120			
D7104	8-719-912-20	DIODE 1SS120			
D7105	8-719-912-20	DIODE 1SS120			
D7107	8-719-912-20	DIODE 1SS120			
D7108	8-719-912-20	DIODE 1SS120			
D7110	8-719-912-20	DIODE 1SS120			
		IC			
IC711	1-808-854-11	IC M50957-125SP			
IC712	8-759-403-39	IC MN1280-L			
IC713	1-808-855-11	IC M6M80021P			
		RES PACK			
R8711	1-236-600-11	RES PACK			
R8712	1-236-601-11	RES PACK			
		SWITCH			
S7101	1-572-136-11	SWITCH, PUSH			
S7103	1-572-136-11	SWITCH, PUSH			
S7105	1-572-136-11	SWITCH, PUSH			
S7106	1-572-136-11	SWITCH, PUSH			
S7108	1-572-136-11	SWITCH, PUSH			
S7113	1-572-136-11	SWITCH, PUSH			
S7114	1-572-136-11	SWITCH, PUSH			
S7117	1-572-136-11	SWITCH, PUSH			
S7118	1-572-136-11	SWITCH, PUSH			
S7120	1-572-136-11	SWITCH, PUSH			
S7126	1-572-136-11	SWITCH, PUSH			
S7129	1-572-136-11	SWITCH, PUSH			
S7130	1-572-136-11	SWITCH, PUSH			
S7137	1-572-136-11	SWITCH, PUSH			
		CRYSTAL			
X6101	1-577-712-11	SAW F TS1319L			
X7101	1-577-673-11	OSC, CRYSTAL			
X7102	1-577-676-11	CRYSTAL			

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	*1-589-231-11	MOUNTED BOARD, TB-1

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref.No	Part No.	Description	Remark
	ACCESSORIES & PACKING MATERIALS		
	************************		
	1-465-252-31	REMOTE COMMANDER (RMT-V252)	
	2-181-754-01	COVER, BATTERY	
	*3-740-339-01	CUSHION	
	*3-740-340-01	CUSHION	
	3-750-642-11	MANUAL, INSTRUCTION	

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	MISCELLANEOUS	
	***********	
	A-6050-671-A	COMPLETE PCB, 2N2P-V CYLINDER
	⚠1-448-862-11	TRANSFORMER, POWER
	⚠1-466-258-11	MODULATOR, RF
	1-571-931-11	SWITCH, LEAF
	1-571-932-11	SWITCH, LEAF
	⚠1-575-324-11	CORD, POWER
	1-808-710-11	PHOTO TRANSISTOR
	1-808-722-11	DIODE LN59 (LED)
	3-735-687-01	HEAD, FTE
	3-735-729-01	SW, LEAF

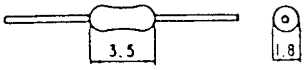
* * *

		HARDWARE LIST
		*************
	7-628-254-00	+PSW, 2.6X5
	7-628-254-10	+PSW, 2.6X6
		SET-SCT
	7-621-732-08	SET-SCT, HEX. 2X3 FLAT POINT
		STOP RING
	7-624-105-04	STOP RING 2.3, TYPE -E
		SCREW
	7-621-770-87	SCREW +P 2.6X5
	7-621-259-85	SCREW +P 2.6X14
	7-621-775-00	SCREW +B 2.6X3
	7-621-775-20	SCREW +B 2.6X5
	7-682-547-09	SCREW +B 3X6
	7-682-647-09	SCREW +PSW 3X6
	7-685-133-19	SCREW +P 2.6X6 TYPE2 SLIT
	7-685-131-19	SCREW +BTP 2.6X4 TYPE2 N-S
	7-685-132-19	SCREW +BTP 2.6X5 TYPE2 N-S
	7-685-534-19	SCREW +BTP 2.6X8 TYPE2 N-S
	7-685-647-79	SCREW +BTP 3X10 TYPE2 N-S
	7-685-647-79	SCREW +BVTP 3X10 TYPE2 N-S
	7-685-661-19	SCREW +BVTP 4X12 TYPE2 N-S
		WASHER
	7-688-001-01	W 2, MIDDLE

* * *

When indicating parts by reference number, please include the board name.

Description
5% 1/4W A
CARBON RESISTOR 5% 1/4W



Value	Part. No.	Value	Part. No.	Value	Part. No.	Value	Part. No.	Value	Part. No.	Value	Part. No.
0.22Ω		11Ω	1-247-784-00	200Ω	1-247-814-11	3.6kΩ	1-247-844-11	62kΩ	1-247-874-11	1.2MΩ	
0.27Ω		12Ω	1-249-394-11	220Ω	1-249-409-11	3.9kΩ	1-249-424-11	68kΩ	1-249-439-11	1.5MΩ	
0.33Ω		13Ω	1-247-786-11	240Ω	1-247-816-11	4.3kΩ	1-247-846-11	75kΩ	1-247-876-11	1.8MΩ	
0.39Ω		15Ω	1-249-395-11	270Ω	1-249-410-11	4.7kΩ	1-249-425-11	82kΩ	1-249-440-11	2.0MΩ	
0.47Ω	1-249-377-11	16Ω	1-247-788-00	300Ω	1-247-818-11	5.1kΩ	1-247-848-11	91kΩ	1-247-378-00	2.2MΩ	1-259-880-11
0.56Ω	1-249-378-11	18Ω	1-249-396-11	330Ω	1-249-411-11	5.6kΩ	1-249-426-11	100kΩ	1-249-441-11	2.7MΩ	
0.68Ω	1-249-379-11	20Ω	1-247-790-11	360Ω	1-247-820-11	6.2kΩ	1-247-850-11	110kΩ	1-247-880-11	3.3MΩ	
0.82Ω	1-249-380-11	22Ω	1-249-397-11	390Ω	1-249-412-11	6.8kΩ	1-249-427-11	120kΩ	1-247-881-00	3.9MΩ	
1.0Ω	1-249-381-11	24Ω	1-247-792-11	430Ω	1-247-822-11	7.5kΩ	1-247-852-11	130kΩ	1-247-882-11	4.7MΩ	
1.2Ω	1-249-382-11	27Ω	1-249-398-11	470Ω	1-249-413-11	8.2kΩ	1-249-428-11	150kΩ	1-247-883-00	5.6MΩ	
1.5Ω	1-249-383-11	30Ω	1-247-794-11	510Ω	1-249-442-11	9.1kΩ	1-247-854-11	160kΩ	1-247-884-11	6.8MΩ	
1.6Ω		33Ω	1-249-399-11	560Ω	1-249-414-11	10kΩ	1-249-429-11	180kΩ	1-247-885-00	8.2MΩ	
1.8Ω	1-249-384-11	36Ω	1-247-796-11	620Ω	1-247-826-00	11kΩ	1-247-856-00	200kΩ	1-247-886-11	10MΩ	
2.2Ω	1-249-385-11	39Ω	1-249-400-11	680Ω	1-249-415-11	12kΩ	1-249-430-11	220kΩ	1-247-887-00	12MΩ	
2.4Ω	1-247-768-00	43Ω	1-247-798-11	750Ω	1-247-828-11	13kΩ	1-247-858-11	240kΩ	1-247-888-11	15MΩ	
2.7Ω	1-249-386-11	47Ω	1-249-401-11	820Ω	1-249-416-11	15kΩ	1-249-431-11	270kΩ	1-247-889-00	18MΩ	
3.0Ω	1-247-770-00	51Ω	1-247-800-11	910Ω	1-247-830-11	16kΩ	1-247-860-11	300kΩ	1-247-890-11	22MΩ	
3.3Ω	1-249-387-11	56Ω	1-249-402-11	1.0kΩ	1-249-417-11	18kΩ	1-249-432-11	330kΩ	1-247-891-00		
3.6Ω	1-247-772-00	62Ω	1-247-802-11	1.1kΩ	1-247-832-11	20kΩ	1-247-862-11	360kΩ	1-247-892-11		
3.9Ω	1-249-388-11	68Ω	1-249-403-11	1.2kΩ	1-249-418-11	22kΩ	1-249-433-11	390kΩ	1-247-893-11		
4.3Ω	1-247-774-00	75Ω	1-247-804-11	1.3kΩ	1-247-834-11	24kΩ	1-247-864-11	430kΩ	1-247-894-11		
4.7Ω	1-249-389-11	82Ω	1-249-404-00	1.5kΩ	1-249-419-11	27kΩ	1-249-434-11	470kΩ	1-247-895-00		
5.1Ω	1-247-776-00	91Ω	1-247-806-11	1.6kΩ	1-247-836-11	30kΩ	1-247-866-11	510kΩ	1-247-896-11		
5.6Ω	1-249-390-11	100Ω	1-249-405-11	1.8kΩ	1-249-420-11	33kΩ	1-249-435-11	560kΩ	1-247-897-11		
6.2Ω	1-247-778-00	110Ω	1-247-808-11	2.0kΩ	1-247-838-00	36kΩ	1-247-868-11	620kΩ	1-247-898-11		
6.8Ω	1-249-391-11	120Ω	1-249-406-11	2.2kΩ	1-249-421-11	39kΩ	1-249-436-11	680kΩ	1-247-899-11		
7.5Ω	1-247-780-00	130Ω	1-247-810-11	2.4kΩ	1-247-840-00	43kΩ	1-247-870-11	750kΩ	1-247-900-11		
8.2Ω	1-249-392-11	150Ω	1-249-407-11	2.7kΩ	1-249-422-11	47kΩ	1-249-437-11	820kΩ	1-247-901-11		
9.1Ω	1-247-782-00	160Ω	1-247-812-11	3.0kΩ	1-247-842-11	51kΩ	1-247-872-11	910kΩ	1-247-902-11		
10Ω	1-249-393-11	180Ω	1-249-408-11	3.3kΩ	1-249-423-11	56kΩ	1-249-438-11	1.0MΩ	1-247-903-00		

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